Ancient Pakistan - An Archaeological History

Volume II: A Prelude to Civilization

Mukhtar Ahmed

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Foursome Group

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Volume I: The Stone Age
Volume II: A Prelude to Civilization
Volume III: Harappan Civilization - The Material Culture Volume IV: Harappan Civilization - Theoretical and the Abstract Volume V: The End of the Harappan Civilization, and the Aftermath

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T a b l e o f C o n t e n t

Foreword to *Ancient Pakistan – An Archaeological History*



Politically, Pakistan is a new state. Historically, however, its outlines can be traced back to at least 50,000 years. Pakistan is an Islamic state but culturally it is byproduct of a multitude of historical processes, of which Islam is only the most recent component. These historical processes were primarily the result of geographical and geological features of the land, which have shaped not only

her history but prehistory as well. Through these processes, this piece of land, irrespective of its names and political configurations at differing times, emerged as a distinct cultural entity at a very early stage and, as such, it deserves a historical treatment separate from India and separate from Central Asia. This book, spread over five volumes, is a partial answer to this need.

In undertaking this work, I have been all too aware that ultimately this exercise bore upon the existence of Pakistan from the very early times as a unique geographical and cultural reality, of which the Indus Civilization was only one of the several manifestations that are known to the general public. This reality, long ignored, is indeed a cornerstone of the present work. As the reader proceeds with the narration, he or she realizes that age by age, period by period, region by region, cultural traits are born, grow, and change as they interweave with other traits and form institutions, social behavior, cultural values, and technological bases that together make up the prehistory of Pakistan. In this process, the reader also realizes that this history is quite different from that we come across in the east of the Indus Valley or to the north and the west of the Hindu Kush Mountains.

Pakistan has been an area of intensive archaeological research for over a century. In recent times the pace of this research has increased manifold, and despite some major unknown areas, we have reached a stage of knowledge where it is possible to offer a connected account of the prehistory of this land primarily, if not exclusively, on the basis of archaeology. The present work aims to do that. It is, however, much more than a compendium of archaeological data of ancient time, bringing out, as it does, the flow of Pakistan's grass-root archaeological history in all its continuities and diversities.

It is an attempt to sum up the heritage of the remote past of this vast and in so many ways a unique region to which we owe our present e'lan in South Asia. It has twofold ambition, to embrace the remote past of the Greater Indus Region, now called Pakistan, in its entirety and to sum up all that we know about that past at the present time. It adopts an intellectual approach that is more interpretative than descriptive, placed in a universal frame of reference. Pakistan's history and prehistory has been traditionally told in context with "India" or the Indian subcontinent, often termed as South Asia; this book parts company with its predecessors on several essential points. In the first place, it deliberately confines itself to shedding light on only one geographic area of South Asia rather than attempting to search for some kind of elusive unity in clearly diverse region. Secondly, it concentrates on the history of cultural development rather than on events.

Beginning with the first stone tools in Pothwar in the north of Punjab, the book traces the archaeological history of this land and examines the multiple strands of cultural development that weave the prehistory of this country all the way to its early historic foundations. Among other things, it discusses the basic significance of the prehistoric studies of the Greater Indus Valley, the variegated pattern of the beginning of human existence in Pothwar through the course of the Ice Age; the beginning of agriculture and village life in Baluchistan and western Sind; the evolution of a prehistoric high culture that came to be known as the Indus or Harappan Civilization; the examination of the possible causes of the decay and demise of the Indus way of life and its transformation into a culture which, for lack of any other suitable name, we must refer to as the Vedic transformation. This material has been arranged as follows:

Volume I: *The Stone Age:* This volume deals with the question of the early hominins that populated this land in the remotest past, the stone tool technologies and their transformation with time, and the direction that these traditions were setting for the coming agricultural revolution. Chronological;lie,

this volume covers the time period from *ca.* 2 million BC to *ca.* 10,000 BC.

Volume II: *A Prelude to Civilization:* This volume essentially covers the beginning of agriculture and animal domestication in Pakistan, development of farming villages, and the evolution of the Early Indus cultures throughout the Greater Indus Valley, along with the concomitant changes in artifactual technology, the pottery, the art, and the subsistence practices. It leaves the Indus man at the doorsteps of an urban society, namely, the Indus or the Harappan Civilization. This volume covers a time period between ca. 10,000 BC to 2,500 BC.

Volume III: *Harappan Civilization - The Material Culture.* As the title implies, it covers the rise and fall of the material culture of the Harappan Civilization. This volume covers the time period between *ca.* 2,500 BC to 1,800 BC.

Volume IV: *Harappan Civilization - Theoretical and the Abstract*. This volume deals with a few theoretical and abstract issues, such as the language and the script, the religion, the social organization, and the nature of the Harappan state, etc, which could not be dealt in other volumes. Like Volume III, this volume also deals with the time period between ca. 2500 BC and 1800 BC.

Volume V: *The End of theHarappan Civilization, and the Aftermath*. This volume deals with the decay and demise of the Indus Age, the examination of of the various degenerated local cultures that replaced the Harappan Civilization, causes and enabling factors assigned to this decay, and the problem of the advent of the Indo-Aryans in the greater Indus Valley. This material is connected with the time period between *ca.* 2000 BC and the middle of the first millennium BC.

These five volumes cover an immensely long period of time and encompass a large set of archaeological data. A certain level of previous knowledge about the subject is needed to fully comprehend the material evidence and appreciate the bases of interpretations.This background knowledge is briefly covered in the respective volumes to render them independent readings. For those who would rather start with firmer footings or for those who would like to explore the relevant topic somewhat further, an extensive Bibliography has been attached to each volume.

Given the extraordinary discoveries of human fossils in Africa, the fascinating finds of cave art in Central India, superb specimens of stone tools in Western Europe, and the antiquity of agriculture in the Fertile Crescent, one may wonder, why study the Stone Age record of Pakistan at all? The simple answer is that Pakistan has its own remarkable finds, and it has an archaeological record that rivals in richness those in better known regions of the world. The more complicated and important reply, however, is that Pakistan has a distinctive early archaeological record that challenges many of the models and theoretical frameworks that have emerged on the basis of findings made in other regions. It provides the opportunity to reevaluate, refine and in some cases revise a number of major conclusions concerning our evolutionary history, including the evolution of man; the emergence of modern human behavior; the beginning of sedentism and agriculture; the emergence of social complexity and urbanization; and constantly confronting the problem of incursions by barbarian argopastoral intrusions, which kept this land politically out of balance throughout its history but at the same time benefited it with new blood, new ideas, new socio-economic systems, new religious thoughts, and much more.

Pakistan is of course not just of interest to archaeologists. It is a land of incredible cultural, linguistic, ethnic, and genetic diversity, and its contemporary populations have constituted the focus of a wide

range of disciplines, including anthropology, linguistics, history, and population genetics. In these disciplines too, Pakistan has much to offer in terms of general theoretical models and frameworks. Indeed a number of noteworthy studies in the ancient past of Pakistan has been undertaken in the past fifty years or so, taking advantage of the progress made in the disciplines of geology, archaeology, anthropology, linguistics, population genetics, ethnography, biological sciences, sociology, and the like. All of these research areas, however, suffer from two key problems. One is their isolation and lack of engagement with other disciplines investigating this geographical area. The other is the almost universal convention of studying Pakistan as a part of "India".

This volume constitutes a bold attempt to bring together a variety of these disciplines in the study of Pakistan's ancient past and to study this region in its own right, not as a part of some hypothetical "India", nor a part of some nebulous "Central Asia". This is, of course, a huge undertaking and no one person, no matter how great his or her capabilities, can be expected to do it a justice. Thus, *Ancient Pakistan* can only be viewed as the beginnings of what is hoped will be followed by other more scholarly treatment of the subject.

The term 'Pakistan' is a political designation, meant to describe an area containing the modern nationalities of Punjabis, Sindhis, Baluchis, Pashtuns, Kashmiries, Makranis, Muhajirs, Hazaras, and a whole number more. Pakistan is a large landmass, measuring almost a million square kilometers in extent and is the second largest of the seven countries that make up the South Asian region, India being the largest. It is the sixth most populous country in the world. The size of the landmass in itself suggests that there is much to be gained from examining the history of human geography, including population dispersals, cultural interactions of various ages, and deciphering the overall trajectory of human evolution in this unique region.

Pakistan presently contains nearly 180 million inhabitants. The people in this landmass speak at least 25 different languages although almost all of them belong to one single family of languages, the Indo-Iranian. The linguistic diversity of Pakistan is matched by a wide and impressive cultural, tribal, and genetic diversity. For example, here one encounters "African-looking" people (the Makranis) on one hand and distinctly "Mongol-type" population (the Hazaras) on the other. In recent years, geneticists have been particularly enthusiastic about tracing the history of various Pakistani populations, linguistic groups, cultural and regional 'nationalities', and anatomically distinguishable endogamous groups, through mapping their genes and making connections with other world populations. These methodologies and results have been published in journals of diverse disciplines and their tempo seems to be increasing in recent years. The reader will find references to these research works as we proceed with our account in respective volumes.

The *Ancient Pakistan* has been written on historical principles, beginning with the discovery of stone tools of the early hominids in the Pothwar Plateau two million years ago and culminating at the end of the Harappan Civilization some 1500 BC. It is not a linear story but efforts have been made to make it as streamlined as possible. The principal topics in all volumes are mainly dealt with from the perspective of archaeology, aided by anthropology, along with a sprinkling of geology and population genetics. There are several reasons for approaching the ancient history of Pakistan in this way, the most important of which is that there is a dire need for such a narration and no major exposition of this nature so far exists. Secondly, this kind of narrative allows one to present and discuss a range of opinions on the various subjects that are pertinent to the study of ancient lands.

The approach taken here is also a geographical one. This is something that plays an essential part in understanding the regional character of Pakistan's cultures throughout the changing times of the past and its fundamental quality of diversity. The character of Pakistan's changing cultures is as distinct as that of Europe, for example. Like Europe, it comprises a number of cultural and linguistic entities, the composition of which has changed continuously through its long history. One of the distinctive features of Pakistan's cultural history is the way in which it has encapsulated human communities of diverse nature at many different cultural and technological levels, allowing them, to a large extent, to retain their identity but still making it possible to establish inter-community relationships.

These characteristics have given the peoples of Pakistan in prehistory a peculiar flexibility and adaptability of their own. It is evident from a variety of prehistoric data that in changing circumstances the people had within themselves the means, and the intellectual reserves, to deal with the often catastrophic problems that arose in the unpredictable environment of the region. The history has shown that when one means of survival became impossible there was always another.

The basic premises of this work are three. First, it is a fallacy to portray the Indian subcontinent of antiquity as a single geographical and cultural unit of which ancient Pakistan is supposed to have been a part. Archaeological evidence is overwhelmingly against such a proposition. Even a cursory look at the archaeological data would show that the region that is now known as Pakistan always remained shy of India, namely the area that lies beyond the Great Indian Desert, but has had considerable affinity, both cultural and genetic, with Central Asia. Second, ancient Pakistan, consisting essentially of the Indus plains and the surrounding hills and plateaus, started to develop as a culturally interrelated region right from the Stone Age. The large bank of stone artifacts, the nature of lithic technologies, and the newly accumulating genetic data, stand witness to this proposition. This was, of course, the result of its peculiar geography, which provided it with a wall of mountains to its west to separate it from Central Asia, and a formidable desert, the Thar, to its east to separate it from the rest of the Indian subcontinent. Third, ancient Pakistan did not exist in isolation; from the very beginning, it

In fact, the world known to the inhabitants of ancient Pakistan was the world more to its West than to its East.

was either a part of the known world or its past can be better understood in context with the prehistory of the known world. This world is by no means confined to "India" or the Indian subcontinent in general but extends long distances to the West. In fact, the world known to the inhabitants of ancient Pakistan was the world more to its west than to its East.

Starting from these working hypotheses, I have attempted to indicate the nature and succession of various cultures, which determined the early development pattern of this land. The evidence is generally archaeological in nature, but, as stated earlier, other disciplines, such as population genetics, linguistics, geology, anthropology, etc., also play their respective role. The geographic area discussed comprises the region within the approximate boundaries of the present-day Pakistan – from the Indo-Gangetic Divide to the Khyber Pass, from the foothills of the Himalayas to the coast of Makran, from the current Indo-Iranian borders to the Runn of Kutch, from the Gomal Pass to the dry bed of the Ghaggar-Hakra River at the edge of Cholistan, and from the rugged hills and valleys of Baluchistan to the vast desert of the Thar. The area between the Ravi and the Sutlej/Beas, although not within the current boundaries of Pakistan, is included as, geographically, it lies within the Valley of

the Indus and has therefore been a part and parcel of the Indus cultures in the past. Similarly, a sliver of coastal land in Kutch, essentially the Indus delta, is also included although current political boundaries exclude it.

The superficial observer would sneer that India has had some episodes but no history, and ancient Pakistan and Central Asia had neither episodes nor history. This skepticism is used to justify lack of study and an absence of interest in the ancient past of Pakistan on the part of scholars. It is also used to justify the relegation of this land to a status of the Indian hinterland unless forced by overwhelming archaeological evidence to mention it separately as “northwestern India”. It is further used by the intelligentsia of Pakistan to justify the beginning of Pakistan’s history with the invasion of Muhammad Bin Qasim, or those of Ghouri, Ghaznavi, and the like at best and with the inception of the Muslim League at worst.

The considerations that follow will show that the absence of episodes does not necessarily negate the existence of history. Judged by the standard of time, this region was thickly populated from the very early times of human existence and these human beings have left a heavy trail of footprints on the sands of time. All we have to do is to reconstruct a history without episodes, which means that it cannot be the same type of history as we are generally familiar with through our school textbooks. The present series of books is a small step in that direction.

Essentially, this work is a narration of the story of the Indus man in his remote past, his struggle for survival, his ingenuity, his accomplishments, his failures, and his capacity to endure. At the end, it is an attempt to dislodge the student of history from the traditional timeline of Pakistan’s history and focus his or her attention on its very beginning. It is hoped that this effort will help the reader in thinking about Pakistan as a land of antiquity instead of looking at it only in terms of Muhammad Ali Jinnah, the Muslim League, the Partition of British India, or the playground of various military and civil despots since then.

I have tried to rearrange the available archaeological data in such a way that a comprehensible story of Pakistan’s ancient past could be told in context of Central Asia as well as that of the subcontinent. In doing so, if I have been able to wean the reader away from a purely Indo-centric point of view of history and redirect his or her attention to the area of Baluchistan, Sind, Punjab, and the Pashtun country itself and do so with reference to Central Asia and Iran with which this land has had a longstanding historical and cultural relationship, I must consider this whole effort worthwhile.

This is, obviously, a radical change in perception and dissenting voices will definitely be heard. Since it is an unconventional approach and since this point of view is being advocated here with some vigor and enthusiasm, it is inevitable that a great deal of technical detail had to be included. By the same token, if the reader detects a sort of missionary zeal in the book, it is inevitable, in fact necessary; it is the very *raison d’etre* of the present work.

At the end, it is hoped that this effort will help the reader in thinking about Pakistan as a land of antiquity instead of looking at it only in terms of Mohammad Ali Jinnah, the Muslim League, the Partition of British India, or the playground of various military and civil despots since then.

One needs patience and a degree of perseverance for reading books on prehistory, archaeology, and anthropology (and now, on archeogenetics) in spite of the initial aura of romance associated with the subject. However, the reader who sticks to the task may find gratification and great satisfaction in

sensing, as the author does, the heroic struggle of man to survive, his endless adaptation to the changing environment, and his compulsion or genius for material progress. The story of the early man who inhabited ancient Pakistan is particularly interesting; the presence of human ancestors in the northern Pakistan some two million years ago, their continued adaptation to the radically changing environment, their technological dexterity, as shown in the fashioning of their intricate stone tools, and their artistic abilities as are apparent from the exquisite paintings on pottery, is an intriguing story in itself.

The extraordinary contribution of the Indus people to the development of agriculture and animal husbandry in the foothills of Baluchistan has not yet been told fully but it has recently started to come to light, albeit grudgingly and albeit hesitantly. The remarkable acumen for city and town planning of the Harappans speaks volumes about their vibrant culture; their spirit of venture on the high seas still resonate in the word *Mallah* (the Sailor) which is

evidently a derivative of the *Meluhha* by which the Mesopotamians knew the Indus people in the third millennium BC; their composition of religious hymns (the *RgVeda*) is undoubtedly the first; and their contribution to the development of Sanskrit and its vast literature is legendary. All this must make an interesting story.
The idea for undertaking this project principally stems from

that towering archaeologist of India and Pakistan, Sir Mortimer Wheeler (*Five Thousand Years of Pakistan*, *Indus Civilization*, among others). Additional inspiration comes from Aitzaz Ahsan's *The Indus Saga*, which in effect is a half-hearted appeal for looking at the history of Pakistan in its own right rather than as an appendix to the history of "India". The process of gathering together material, planning and writing this book imitate Yahya Amjad's book *Tareekh-e-Pakistan - Kadeem Daur.*

This book has not been written for fellow historians; its audience is the inquisitive student of history who is interested in looking into Pakistan's ancient past in some detail. The book is also intended for the general reader with an interest in the cultural history of Pakistan, and how it came to be as it did. It may also perhaps be useful to the student embarking on the study of South Asian archaeology or ancient history of this region. It is emphatically not a compilation or compendium of available information; nor does it claim to be comprehensive at the level of theory or ideas within the fields it touches. What I have tried to do is to tell as coherent a story as is possible at the present time, of the development of human life and culture within the region that lies between the Hindu Kush Mountains and the Thar desert, indicating the main trends, principal motivating factors and important turning-points, as we see them on the long road from the earliest toolmakers, over two million years ago, to Early Historic times in the early centuries B.C.

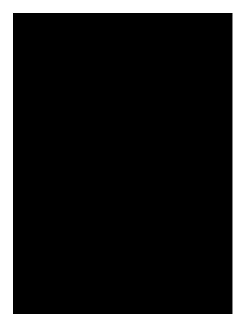
I am aware that what is known today about the remote past of this land is so tentative and fragmentary that it can be critiqued for not managing the subject in a way that comes to approaching completeness or definitiveness. This is, obviously not possible at this stage or anytime soon. Future research will definitely add more details to the subject and the interpretative approaches will surely keep on changing.

Finally, and most importantly, it must be stated and explicitly acknowledged that *Ancient Pakistan* is a synthesis of a large number of excellent writings by world-renowned archaeologists, prehistorians and scholars of related disciplines around the world. Since it is a synthesis, no originality is claimed. My job has been nothing more than putting in order the available information widely spread out in

various books and monographs as well as original archaeological reports and research papers. Some of these writings have been extensively reproduced here without putting them in quotation marks, generally giving specific reference to their origins but sometimes, inadvertently, of course) without. However, most of these sources have been listed in the references at the end of each chapter or section. The same applies to various figures, photographs, drawings, and sketches. My gratitude to all these researchers and scholars is, of course, due and I am deeply indebted to all of these authors and publishers.

M.Ahmed

Preface



This book is the second volume of the series *Ancient Pakistan - An Archaeological History*, the first being the *Stone Age*. It picks up the narration of human condition at the terminal stage of the Stone Age when humans were ready to leave behind the life style of nomadic hunter-gatherers and begin to settle down in permanent or semipermanent locations. Concurrently, they were beginning to produce their food rather than being totally dependent on nature for whatever she chose to dish out. The origins and spread of agriculture and pastoralism in Pakistan form a central theme of this volume. In the end it sets the stage for an extensive urban civilization throughout this land; hence the title *A Prelude to Civilization.*

In the *Stone Age*, we left the Indus man toiling in Pothwar, shaping the chert nodules into shapely tools in the Rohri Hills, struggling to stay alive in the caves of Sanghao, and probably fishing and camping along the coast of Sindh and Makran. Throughout this extraordinary ordeal, which we call the Paleolithic, man has survived as a forager and obtained his subsistence by hunting and gathering food what nature chose to offer. By necessity he is a mobile creature. When we meet him again, we see him living at fixed locations in parts of Baluchistan and producing his own food instead of waiting for Nature to offer him its bounties. He is now engaged in rudimentary agriculture and animal herding. He still does not know the art of pottery but he learns it soon. In short, he has transformed himself from a *Paleolithic* creature into a *Neolithic* man.

The narration brings us to a point in time when the people of ancient Pakistan were just starting to experiment with the trappings of urban society. It goes on to investigate the course of cultural developments that lead to the emergence of an extensive network of large and small agricultural villages all over the Greater Indus Valley. In so doing, it covers a long period of human existence in Pakistan that spans from 12,000 BC to roughly 3,000 BC. This account leaves the Indus man at the doorsteps of the Harappan Civilization. This is an immensely interesting time period in the prehistory of any people and of any country; it is doubly so in the case of Pakistan as it connects two very important cultural regions of the Old World - West Asia on one hand and Indian peninsula on the

other.

This stage of Pakistan's prehistory has already been narrated by Gregory L. Possehl in his *Indus Age - The Beginning* (1990) and by Shashi Asthana in her *Pre-Harappan Cultures of India and the Borderlands* (1985).The question may, therefore, be asked about the utility of another book on the same topic. Although it is difficult to substantially improve upon the archaeological data and the general account, the reader will find the present book quite different. Compared to the previous attempts, the present volume is more in the nature of a historic account. In this respect, it is more focussed in its approach to history rather than archaeology. Furthermore, it concentrates solely on Pakistan and it has its own advantages. Nevertheless, there is much in common and I have taken the full advantage of the material that these books, especially the *Indus Age*, provide.

The long period of growth, change, and transformation, which begins with early villages and camps and ends with the maturation and withering away of the Indus Civilization has been called by Gregory L. Possehl the *Indus Age*. This is a very appropriate term and it does justice to call a sizable period of Pakistan history by this name. For this reason I have used this tern quite freely in my text, of course always mindful of its origins. The Indus Age is a period of immense importance not only to the history of Pakistan but also to the entire South Asia. Technological innovations, especially those related to agriculture and animal husbandry, were a steady stream, populations were on the increase, cultural traits were rapidly changing, area of cultural influence was steadily expanding, and the material prosperity was on the increase. This is certainly one of the most exciting periods of Pakistan's prehistory. This may not be a straight line journey but we need to approach it in this way to make it comprehensible.

The Indus Age is generally portrayed as a part of the history of South Asia, now dominated by the modern nation states of India, Pakistan, Bangladesh, Sri Lanka, Nepal, even Afghanistan and eastern Iran thrown in for good measure. This is stretching the geographic scope of the Indus Age a little too far: the Indus Age, as meant here, is nothing more and nothing less than what its names implies: it is truly the history of the Greater Indus Valley, the geographical area that is now Pakistan. The Indus River and its tributaries are a focal point of life in the description of this time. It includes the Indus plains (Punjab and Sindh provinces of modern Pakistan), the mountainous eastern edge of the Iranian Plateau (Baluchistan and the Pashtun country, which now goes by the name of KhyberPakhtunkhwa), a part of the Indus delta that includes Kutch, a part of the Great Indian Desert, the Thar, and a sliver of the Indo-Gangetic Divide.

As stated earlier, a major part of this volume pertains to the agricultural revolution in Baluchistan and the development of village farming communities in Sindh and Punjab. In effect, it is the story of the Neolithic Pakistan and the progression of her people toward an urban culture. Thus, notwithstanding the major scene of this narrative, the story is told from the perspective of the Indus Civilization. In effect, this is the anchor to which the writing of the whole prehistory of Pakistan is tied to. It is not surprising, therefore, if we encounter repeated reference to the Indus Civilization in reading the account of the Indus man's journey from Mehrgarh to Mohenjo-daro and Harappa.

The origin of Harappan Civilization remained enigmatic for a long period of time till we discovered a long trail of regional cultures behind it and till prehistorians were able to connect the various cultural points and bring the whole historic outline in focus.This volume describes this process. However, as we proceed on this arduous journey, we are confronted with further mysteries: the

origins of agriculture and animal domestication, the spread of agricultural practices and propagation of crops, early human settlements, spreading of countless farming villages throughout Pakistan, and above all, the interaction of the population groups of the Greater Indus Valley with the borderlands.

The development and spread of agricultural

The development and spread of agricultural 3000 BC, leading to an extensive urban civilization within the same boundaries, clearly calls for a geographical approach. Thus, the land always flits in and out of the archaeological narrative of the people and their cultures. My approach to the prehistory of Pakistan remains, as it was in the *Stone Age,* a geographical one. In effect, this is a history of land as well as its peoples.

The explicit aim of the present volume is to set the study of the post-Pleistocene history of Pakistan in a comprehensive archaeological framework. It presents an extensive review of the available data related to the environment, the development and spread of agriculture and the consolidation of the Early Harappan cultures to set the stage for the coming urban revolution. It takes into account the most recent discoveries in the Near East, Iran and Central Asia and tries to evaluate their significance to the understanding of the formative processes of the Indus Civilization. In so doing, it is shown that the notions of dependence and cultural backwardness, which have been widely used in the interpretation of the prehistory of South Asia, are no longer valid. At the same time, the common practice, so prevalent in South Asian archaeology and indeed the mainstay of the writings of its masters, of lumping Pakistan's prehistory with that of India is hopefully negated. In this respect, this volume is a continuation of the theme first taken up in the first volume (*The Stone Age*) of this series.

In the first volume of this series, i.e. *The Stone Age*, our focus of attention was Pothwar Plateau and the lower Indus Valley, other regions playing a secondary role. In the present volume our focus shifts to Baluchistan. The other areas of the Greater Indus Region do come into picture but largely as beneficiaries of the developments in Baluchistan. This is a radical change in our focus and it requires a detailed look at the geographic features of Baluchistan as well as the flora and fauna of this land. This has been done.

How did this fundamental, some say 'revolutionary', change happened, we do not in fact know. Similar cultural changes also took place in other parts of the world, the Near East is probably the first of them. This area has been researched quite extensively and the results obtained from this work can possibly be used to gain some insight in other areas of comparable environment. It is in this sprit that the considerable attention has been paid here to the discoveries in the Levant and the Fertile Crescent in general.

This volume covers the time line from *ca*.12,000 BC to *ca*. 3,000 BC. Covering all of the regions of Pakistan through this long span of time is surely a daunting task. It is also fraught with potential pitfalls at every step. The focus of such an undertaking should be a clear assessment of the available information, recognizing the long-term settlement history of the land in its multiple strands of development, and integrating its different components and phases into a unified narrative. How far did I succeed in this endeavor, I really do not know. I am confident, however, that a small step has been taken toward this direction as a consolidated material on the prehistory of Pakistan now exists where it did not exist before.

Some conclusions and viewpoints in this volume are necessarily tentative and will be surely modified

and supplemented in future when more information comes out from the ongoing research in Pakistan and the neighboring lands. Similarly, some statements would be controversial and they would surely stimulate active attempts in interpreting the available data.

M.Ahmed ! A Prelude to Civilization

SECTION I !

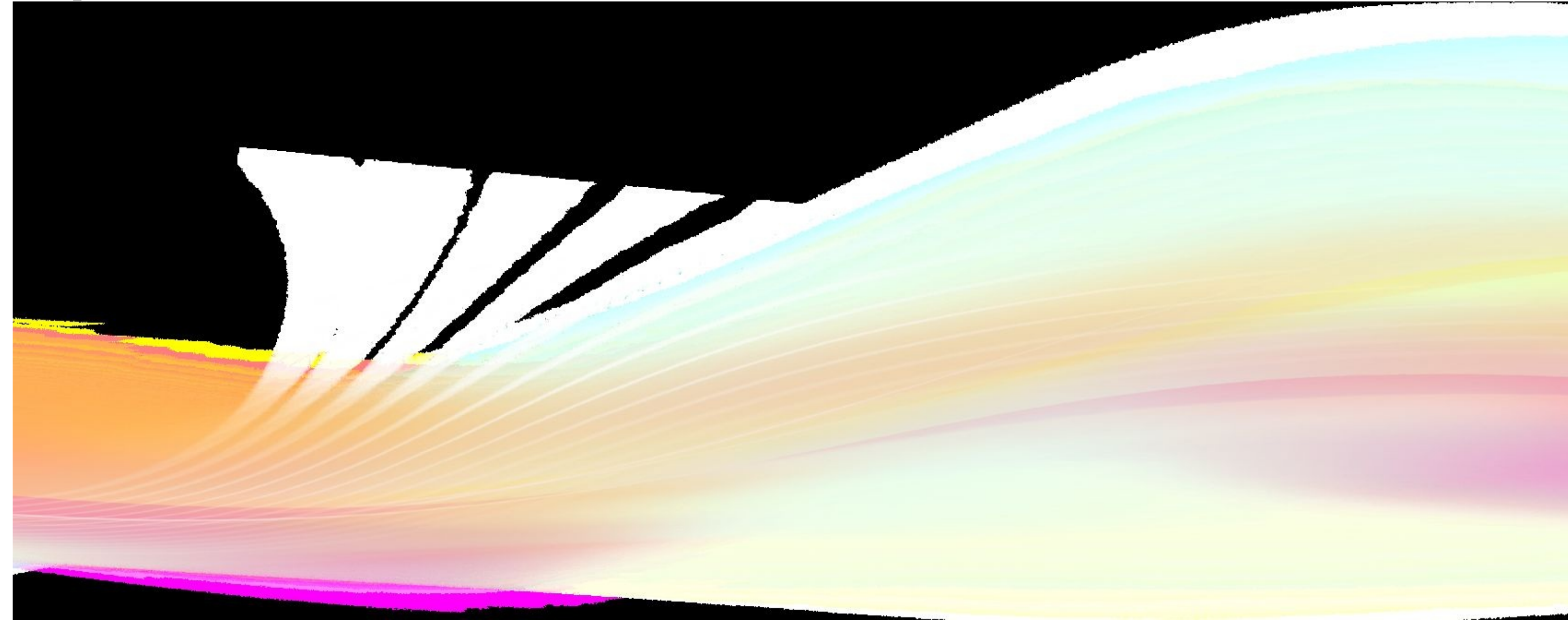
Preliminaries

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SECTION I

Chapter I.2. The Land Chapter I.3. The Environment

Preliminaries



I.0. Preliminaries



This Section deals with a few peripheral subjects that provide a background for what will be discussed in the rest of the book. For instance, throughout our subsequent discussion on the course of Pakistan's evolution from the Stone Age to the establishment of early settlements and vigorous village farming communities, land will form a major backdrop for

the presentation of evidence and analysis. A hefty chapter on physical and cultural geography is therefore provided. Similarly, long-term climatic changes to which the ancient man was subjected and to which he had to constantly adapt to be spared from extinction, has been dealt with in some detail.

The history of ancient Pakistan, and for that matter, of any other region of the world, is not based on

any written document or oral tradition. Archaeologists, aided by other scientists, are the real authors of this history and we need to familiarize ourselves with their terminology and methods of investigation. Archaeology becomes history in context of time and it, along with the related disciplines of anthropology, is an essential determinant of any narration of events and cultural change in the ancient times. Chronology, thus becomes important. The same, more or less, applies to other topics covered in this section.

I.1. Introduction



This volume is the prehistoric account of the Indus people from the terminal stage of the Stone Age to the stirring of urbanization in the Greater Indus Valley, now Pakistan. We peruse this objective in three stages:
1) The beginning of agriculture and settled life in

parts of Baluchistan,
2) The development of village farming societies all over the Greater Indus Valley, and
3) The emergence of regional cultures that were the harbinger of the Harappan Civilization.

It is not a linear story but efforts will be made to smooth out the rough edges and present it as a free-flowing narrative. The story is not based on any written account, it is a product of a century of painstaking archaeological research. Archaeological accounts are often a difficult read; these accounts have been made somewhat palatable by minimizing the details and illustrating the text profusely with appropriate sketches, drawings, maps, and the like. This chapter is in the way of introducing the subject and forms the basis for the material covered in the rest of the book.

South Asia, the Subcontinent, and Ancient Pakistan: We begin with the terminology used, especially what do we exactly mean by South Asia, the Indian subcontinent, and ancient Pakistan. The term ‘South Asia’ is a political designation, meant to describe an area containing the modern nations of Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka. It is a large landmass, measuring about 4.4 million square kilometers in extent. India is the largest of the six or seven countries that make up the region, measuring 3.3 million square kilometers, or six times the size of France. The size of the South Asian landmass in itself suggests that there is much to be gained from examining the history of human geography in this region, including population dispersals and cultural interactions of various ages.

South Asia is also called the ‘Indian subcontinent. This nomenclature has, however, is becoming less and less common in recent years, save in India and Pakistan where it is still quite popular. Although most often used synonymously, the concept of the Indian subcontinent is somewhat different from that

of South Asia: the term, 'Indian subcontinent' is a geographic one, meant to differentiate it from the rest of the Eurasian continent while, as stated before, the term ‘South Asia’ is a political designation. The Indian sub-continent is composed of several regions, with diverse environment and differentiating topography. Certain geographic areas were here attractive to humans on account of their natural resources and ease of travel, whereas other zones, such as large mountain chains and dry deserts, were unattractive to human settlement and barriers to communication. One of the most striking features of the subcontinent is the Himalayan mountains, which rises to a height of 8,850 meters at Mount Everest, and provides a nearly impenetrable barrier in the north. Another feature of almost the same magnitude is the presence of a vast desert, the Thar, that intervenes between Pakistan and India.

Like other areas of South Asia or the Indian subcontinent, Pakistan has a unique geography and climate and this has imparted to this region a distinct trajectory of cultural developments which distinguishes it from Iran and Central Asia on one hand and from peninsular India on the other. The major landmark for ancient Pakistan was the Indus River or the Sindhu; it is still so for modern Pakistan. The words 'India', 'Hindu', and 'Hindostan' originate from the name of this river. Ancient Chinese sources refer to the land of 'Shen-tu'; Greek texts mention 'Indos', and Persian inscriptions describe 'Hindu' as one of the subject countries of their Achaemenid king Darius. These terms initially referred only to the Indus Valley, but their connotations expanded swiftly to the whole of the subcontinent. Many centuries later, Persian texts used the word 'Hindostan' for this vast stretch of land and 'Hindu' for its inhabitants, while retaining the name ‘Sindh’ for the general area that is now Pakistan. The Arab travelers and historians also kept a distinction between ‘Sind’ and ‘Hind’. For them ‘Sind’ was the area east of the Great Desert, the Thar, and ‘Hind’ represented the region beyond it. Before all of this, RgVeda called this region the ‘Sapta Sindhu‘ (the country of seven rivers).

For the British and Europeans the entire subcontinent was ‘India’ and they managed to mold the minds of several generations, especially of those who were exposed to the colonial education system or had anything to do with the bureaucracy. In the folk culture, however, the distinction between ‘Hind’ and ‘Sind’, continued: Sindh, Punjab, and the Pashtun country where ‘Sind’ while ‘Hind‘ meant the area of the subcontinent beyond Sutlej/Bias, across the Great Indian Desert, and somewhere away from the salt marshes of Kutch. The colonial legacy, subcontinent as one large ‘country’, they treated the Indus Valley as an appendix to this political unit. Their scholars wrote the history of ‘India‘ by explaining away or simply ignoring the fundamental geographic and cultural imperatives of this area and its peoples as ‘regional differences’. The native scholars followed the lead and some of them are still traversing the same path.

Archaeology and cultural prehistory of modern states do not necessarily correspond with their political demarcations but in this respect Pakistan is somewhat unique: the boundaries of this land have been determined as much by nature as by man. These naturally demarcated boundaries



A 1909 official map of British India; notice a large landmass of varied geographies lumped into one 'country'

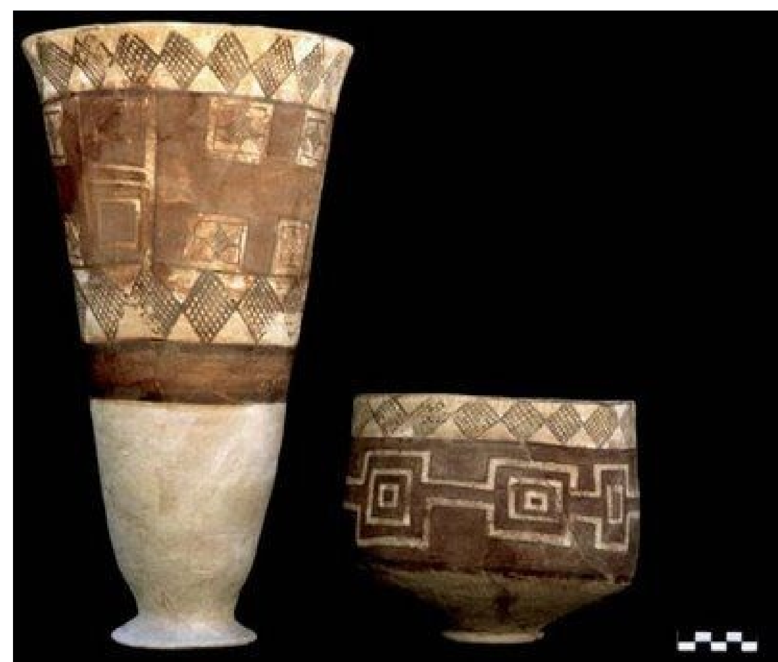
probably more so in India than in Pakistan, nevertheless, lingered on and this has created a lot of complications in the writing of early history of this region.

While the idea of Pakistan forming a distinct geographic, religious, and cultural unit is an old one, its status as a multinational state emerged only in recent times. Since the colonial powers viewed the have been, of course, fuzzy in some areas and illdefined in others but the general outlines are pretty well demarcated and ancient.

Ancient Pakistan, as viewed in this book, comprises of the existing territories of modern Pakistan, Kutch and southwestern Gujarat of presentday India and a small area of Indian Punjab and Haryana in the northeast, collectively called the Indo-Gangetic Divide. In the West the boundaries may extend a little into the present-day Afghanistan, probably to as far as the Hindu Kush Mountain Range, sometimes contracting to as near as Peshawar. The borders with Iran are somewhat fuzzy but the prehistorical borders more or less correspond with the present-day delineation.

The area between Kutch and the IndoGangetic Divide is a formidable desert and this separates Pakistan from India all along their common borders. The Thar Desert has always been a barrier to the movement of men and beasts in prehistoric as well as historic times between Pakistan and the present-day India. To a large extent, it still is.
fall patterns shape the distribution and abundance of flora and fauna, offer essential nourishment to stressed ecologies during dry seasons, and present vital water supplies for sustaining domesticated plants and animals. Pakistan, as a whole, is, how ever, a desert country, where the monsoons are of only marginal value. Thus, the term 'Indian subcontinent' as an ecological unit is of questionable utility in the study of prehistory of the region: thus, Pakistan has little in common with the rest of the Indian subcontinent, geographically and ecologically, historically or culturally, beyond a superficial proximity of the terrain.

As already lamented in the Foreword and the Preface, a lot of field work and considerable amount of archaeological and theoretical research



has been conducted in Pakistan during the past one and a half century but serious problems hamper a fuller understanding of human evolution and societal change in this area. Too few well-excavated sites, revealing behavioral and cultural change, a poverty of detailed interdisciplinary studies to recover ecological data, and poor chronological controls are some of the symptoms. All these impediments being set in place, the biggest problem in archaeology of Pakistan is the almost irresistible impulse of archaeologists, both local and foreign, for undertaking the study of India and Pakistan under one overarching sweep, ignoring the fact that



there is practically no commonality between the

More ancient than Mohenjo-daro

Contrary to this stark demarcation between

Pakistan and India, the western borders of Ancient Pakistan have always remained fluid. A whole range of mountains defines these borders but these bor ders are porous: a number of passes through these mountains connect Pakistan to Afghanistan and further on to Central Asia. Thus, the people of this region have always remained in intimate contact with those of the west. These sustained relation ships cross-pollinated each others' cultures and fostered the development of common technologies not only in prehistory but in historical times as well.

In between the Thar and the hilly flanks of the country flows the mighty Indus with its various tributaries and these define the area which is com monly known as the Indus Valley. Realizing the unique configuration of this land, and taking note of the common cultural traits in the surrounding high land regions, archaeologists often call the whole area the Greater Indus Region or the Greater Indus Valley. Thus, Ancient Pakistan is essentially the Greater Indus Valley; it is more a cultural and geo graphic unit than a political one.

The monsoon is of fundamental importance for sustaining life in most of the subcontinent. Rain



Ancient terracotta whistles from the Indus Valley

two, neither in archaeological data nor the prehistoric environment. This especially applies to the

maAncient Indus whistlesterial covered in this volume. Still, common theories

and common interpretations of cultural change are Hollow egg shaped whistles may have been used for making music and
sought in utter disregard of archaeologicalfor accompaniment to singers, a tradition that is still present in ruralevi areas of Pakistan and India. The bird shaped whistles were probably
dence, causing nothing but confusion and misinter
used to amuse children and may represent pet birds such as partridges
or doves.pretations. To make matters worse, scholarly research and archaeological interpretations are se

verely impeded by nationalism and political agenda.

Land and Environment: Pakistan covers a large area of over 800,000 sq.km, broadly composed of the Indus basin and the surrounding hilly

 region. The principal geographical feature of the Greater Indus Region is the drainage basin of the Indus River. This includes the lower Indus Valley,

Sindh, and Pakistani Punjab with the four principal tributaries to the Indus: the Jhelum, Chenab, Ravi, and Sutlej Rivers. The ancient landscape included a now dry riverine system, which most of the Indian scholars insist on calling "Sarasvati/Drishadvati" after the RgVedic appellation of a mighty river of some unknown identity. To the west of the Indus Basin is the eastern edge of the great Iranian Plateau and the Hindu Kush. Today this area is known as Baluchistan and Pakhtunkhwa (the Pashtun country). It is mountainous terrain, with rich valley and upland pastures, and agricultural resources in the better watered valleys, such as Kolwa, QuettaPishin, Gomal, Kohat and Bannu. Most of this mountainous area is quite dry and deficient in soils, but it is still rich, especially in the plant and animal resources which figured so prominently in the food producing revolution at the beginning of the Holocene, *ca*. 7000 years ago: wild sheep, goats, cattle, barley, and possibly wheat.

To the southeast is Gujarat, a diverse region composed of Kutch and the salty wastes of the Ranns, the pastures and dry farming areas of the peninsula of Saurashtra (Sorath in antiquity), the sandy plain of North Gujarat (Anarta in antiquity), and the wet coastal area of South Gujarat. This region is known for the dry cropping properties of its "black cotton soil" and the monsoon season cultivation of millets: sorghum or *jowar*, pearl millet or *bajra*. These are not plants endemic to the subcontinent and they seem to have arrived there by a maritime route from Africa in the third millennium B.C. or somewhat later. In the olden days, the Indus delta was situated a little eastward, i.e. in Kutch or even still more eastward. This area was thus geographically and culturally connected with the Greater Indus Valley, that is, ancient Pakistan.

To the north-east are the Indian Punjab, Haryana, northern Rajasthan, and the Ganga-Yamuna Doab of Uttar Pradesh. In premodern times this area was also a dry cropping area. But the principal crops were winter grasses (wheat and barley), grown by virtue of the winter westerlies coming across the

Iranian Plateau. In the third millennium B.C. the Ghaggar-Hakra came together here from the the Siwalik Hills. Today the landscape is divided by canals, many of which retrace old waterstream beds. The Indus culture penetrated this area up to the Indo-Gangetic Divide, an imperceptible hump that divides the Indus plains from those of the Ganga-Jamuna system.

The Greater Indus Region is dominated by two weather systems: the winter cyclonic system (or winter westerlies coming from the western highlands) and the peninsular summer monsoon system, influencing from the northwest. Paleoclimatic studies for this geographical area are contradictory and difficult to apply to the entire region of Pakistan. Possehl (1) has reviewed much of the direct paleoclimate evidence for this region, particularly in reference to agriculture. Further references to the climate change during the early Holocene will be found in Chapter I.3. in this section.

The Indus Age: Origins of settled life in Pakistan can be documented near the beginning of the Holocene, following the retreat of the last continental glaciers in the north,10,000-12000 years ago. Over several millennia of growth and change, early settlements and pastoral camps grew into large agricultural villages and some into the ancient cities of the Harappan Civilization, an urban phase of Pakistan's prehistory. The Harappan Civilization eventually crumbled under its own weight in the second millennium BC making way for a new cultural transformation which we, for the lack of any suitable name, would call the Vedic Transformation. This entire period - the period between the beginning of agriculture and the demise of the Harappan Civilization - has been called by Possehl by the name of the *Indus Age*.

The Indus River and its tributaries are a focal point of life during the entire span of time but the outlying areas feeding the Indus plains are equally, in some instances probably more, important in initiating and sustaining these profound cultural changes. Furthermore, the borderlands of Iranian Plateau, Afghanistan, and Central Asia with their passes, river valleys, and oases, granting ease of access to the Indus Valley, is one of the most important single geographic factors that have determined the cultural trajectory of Pakistan's. Here was the contact zone which kept the Indus cultures sensitive to the great innovations of the West. By the same token, this contact zone also served as a conduit to transfer the cultural, technical, and genetic traits of the West to the rest of the Indian subcontinent although this task was made difficult by the Thar Desert and the marshlands at its both ends. We shall discuss this topic in some detail as we proceed in the next few sections and their constituting chapters.

Culture History: The history of the Indus Age rests on a long history of food production. The chronology used in this chapter is based on a series of stages starting with the beginning of food production (table below). The principal plants and animals were initially the same as those on which ancient Mesopotamia and Dynastic Egypt relied: wheat, barley, cattle, goats, and sheep. The origins of sedentism and agriculture have been researched more vigorously and documented more descriptively in the Near East. This evidence shows that by the eighth millennium B.C. there were village farming communities in that part of the world. Although such data has been accumulating in Pakistan also at places like Mehrgarh, Kili Gul Mohammad, and Gumla on the hilly slopes of the western mountain range, we need to consult the Near East again and again for their interpretation. This necessitates a keen familiarity of the archaeology of the Levant and the Zagors mountains. This is being done in the shape of a meaty chapter on South-West Asia in one of the sections that follow.

The end of the Pleistocene and the onset of the Holocene (10,000-12,000 years ago) provided the

setting for man to make a number of important advances in his control of environment and set in motion a series of events which led ultimately to the appearance of the first urban societies, one on the western end of the Iranian Plateau, that is Mesopotamia, and one on the eastern edge of the Plateau, namely Baluchistan. Similar developments, although not concurrently, occurred in China and Sentral Asia. An important phase in this journey was the Mesolithic, a transitionary time period that intervenes between the Paleolithic (the Stone Age) and the Neolithic (the beginning of agriculture). In view of the importance of this transition from a foraging economy to an urban society and the processes of change that were involved in this transformation, we shall continue this discussion in the next Section. This phase is important in the study of the begincal areas, such as the New Guinea highlands, and these developments may prove to be the earliest Neolithic events to have taken place anywhere in the world. It is sometimes very difficult to determine whether a particular plant or animal was domesticated without external influence, or whether the technique was adopted from other regions and then applied to local species. This applies to ancient Pakistan as well.

Not all human societies were to adopt food production. In some areas, groups of people continued to live as hunter-gatherers, even until recent times. These cultures are often found in extreme environments, such as the Arctic, deserts, and tropical rain forests, where conditions are not favorable for agriculture or animal herding, and where people can only survive by adapting their way of life completely to the surroundings. Other huntergatherers are found in rich coastal areas or fertile,

Proposed Chronology for the Indus Age (9)

Stage	Description	Date
6	Post-urban Harappan	1900-1300 BC
5	Mature Harappan	2500-1900 BC
4	Early-Mature Harappan Transition	2600-2500 BC
3	Early Harappan	3200-2600 BC
2	Developed Village Farming Communities	5000-3200 BC
1	Early Settlements	7000-5000 BC

ning of agriculture and settled life in Baluchistan and elsewhere.

Agricultural Revolution: A substantial part of this volume is concerned with the Agriculture Revolution in Middle Asia (an area that spans from the Mediterranean to the Thar Desert in Pakistan) and its aftermath. It involved sweeping changes in settlement patterns, social organization, and religious systems. At the same time, population growth increased markedly. It was once thought that agriculture arose in one single area in the Near East, from where it spread to the rest of the world. We now know that agriculture developed locally and independently in many parts of the world. A major reason for these developments was the far-reaching global change in climate that occurred after the end of the last Ice Age, some 12,000 years ago.

The ways in which people adapted to the local conditions of their region are clearly visible in the archaeological record. In Southwest Asia and Egypt, in fact in the whole area up to the Greater Indus Valley, this process involved specialization in wheat and barley agriculture, as well as the domestication of sheep, goats, and cattle. In Africa, millet was the first cultivated crop. In the Yangtze River valley of China, rice formed the staple, and in Mesoamerica, maize was the main crop. Root

crops of different kinds were domesticated in many tropitemperate forest regions. This great transition began in the Greater Indus Valley on the border of Sindh and Baluchistan *ca*. 7,000 BC. From there, agriculture spread all over the Valley within a two thousand years, save some remote areas in the north. As stated above, this momentous change in the Indus Valley was foreshadowed by similar changes in West Asia. The warmer and wetter climate that developed at the end of the Pleistocene era, about 12,000 years ago, brought about great environmental changes over a large area. Open woodlands flourished, with nuts that could be harvested and grasses that had the potential to be domesticated, and the warmer winters enabled communities to move from caves in mountainous areas to regions where wild cereal grasses, such as barley and emmer, grew, and could be gathered. The harvesting of grain, in turn, stimulated the development of such tools as sickle blades and grinding stones, and the building of storage facilities, developments that paved the way for the emergence of agriculture. Probably the single most important factor in the transition from a hunter-gatherer economy to a food-producing economy was the establishment of settled communities. The eminent Australian archaeologist V. Gordon Childe saw the change to agriculture and an assured food supply as analogous to the change that attended the Industrial Revolution. In his epoch-making synthesis of prehistory, *Man Makes Himself*, published in 1936, he accordingly labeled it the Neolithic Revolution. For its paramount importance in the early history of Pakistan, in fact in the history of humanity at large, we will be talking about the Neolithic in several chapters that follow.

The Beginning of Agriculture and Early Settlements: It has been a virtual archaeological dogma in the study of the Near East and South Asia that a constellation of potentially domesticable plants and animals (wheat, barley, pulses, sheep, goats, cattle) were first domesticated in the Near East (Israel, Lebanon, Syria, southwestern Turkey, Iraq, western Iran) early in the Holocene (*ca*. 8,000 to 10,000 years ago). These domesticated plants and animals, and the techniques of production, then somehow "diffused" across the Iranian Plateau to Baluchistan (2-8), or brought by some seed-bearing immigrants from the west, and from there they spread to the rest of the Greater Indus Region and later on to India proper. Those who hold to this view can point to the early dates and robust archaeological data sets for the "Neolithic transformation" from Near Eastern sites.

There is no doubt that there are early dates for food producing sites in the Near East and that the substantial amount of excavation there has yielded a reasonably coherent culture historical sequence, but it is based on a kind of self-fulfilling prophesy. Convinced that the Near East was *the* early center for food production, archaeologists turned their attention to the investigation of this region at the expense of others. It is not, therefore, a wonder that the archaeological record of this revolution in human subsistence is best documented there, and not elsewhere. This situation is, however, changing due to the archaeological data that has become available from Kachi plain in Baluchistan, two cave settlements in Afghanistan, and a Neolithic complex in southern Turkmenistan. We shall talk about it in some detail as we proceed. For good measure, a hefty chapter has been included here to sort out the issues involved.

The key site in the subcontinent with evidence for the earliest domestication of plants and animals is Mehrgarh in the Kachi plain on the border of Sindh and Baluchistan. Archaeological data indicate that from the beginning of the settlement the peoples of Mehrgarh were farmers who cultivated five different cereal grains and domesticated goats, sheep,cattle, and probably water buffalo. Although it does not document the beginnings of plant and animal domestication, it does provide us with enough material as to make it possible to speculate on these matters. A full section, constituting several chapters, is included in order to focus on this find.

Village Farming Societies: By the beginning of the fifth millennium not only West Asia but also the Greater Indus Valley was humming with activities in enlarged villages. In large part of Baluchistan and western Sindh, copper was frequently being used, along with lithic tools, These *chalcolithic* villages, with a variety of wheel-turned plain and painted potteries, entered into close networks of cultural and economic interactions with neighboring areas such as eastern Iran, Afghanistan and Central Asia. Such a situation was not the overnight creation: it was the result of a developing process from the eighth-seventh millennium BC. This interaction sphere was slowly and gradually expanding both in contents and space. Even in intensity the interaction was becoming closer and deeper with the passage of time. The whole of the fourth millennium, therefore, witnessed unprecedented cultural cross-currents and probably an influx of populations from the neighboring areas. A full section is to be devoted to the study of these cultural areas where mature village farming societies flourished in numbers.

Geographic Differences in the Onset Of Food Production: Southwest Asia has the earliest definite dates for both plant domestication (around 8500 B.C.) and animal domestication (around 8000 B.C.); it also has by far the largest number of accurate radiocarbon dates for early food production. Dates for China are nearly as early, say ca. 7000 to 8000 years ago, while dates for peninsular India are clearly about 4,000 to 5,000 years later. We are not sure about Central Asia but a date of *ca*. 6000 years is generally agreed on. In western and central Europe food production began with the arrival of South-West Asian crops and animals between 5000 and 3500 BC. The evidence from Baluchistan puts this area a short temporal distance from Southwest Asia, probably only a millennium or less. The evidence for the domestication of sheep and goats is most likely earlier than that from Southwest Asia.

Formerly, all people on earth were huntergatherers. Why did any of them adopt food production at all? Given that they must have had some reason, why did they do so around 8500 B.C. in Mediterranean habitats of the Fertile Crescent, 7000 BC in Baluchistan and western Sindh, only 6000 BC in Central Asia, and so late in India? Why did even people of any region wait until 8000 B.C., instead of becoming food producers already around 18,500 or 28,500 B.C.? These theoretical issues are interesting and a large number of answers have been proposed. We shall discuss them as we proceed, especially in Chapter IV.3. which is devoted to such theoretical issues.

Building the Foundation of an Urban Civilization: Simple regional societies of mature agricultural villages started to turn into complex cultures with a hierarchy of professional classes in which lies the germs of urbanization. With the expansion of agriculture, sufficient ‘surplus’ accumulated and this gave a much needed impetus to arts and crafts that started flourishing. These cultural changes inevitably lead to all round growth and diversity and some of these settlements began to appear as ‘cities’. The pace of growth in material culture was so fast that the cultural change looked 'sudden', so much so that we are unable to trace their evolutionary stages within the society, and often look for outside agencies for their introduction. This stage of cultural development, named here as the ‘Early Harappan’ is extremely crucial in the full understanding of the Indus Age. Because of this importance, we devote full three chapters to this developmental stage.

The large settlements were places where a number of crafts were practiced: the knowledge of metallurgy developed, the art of bead making, initiated in the very early Neolithic sites, such as Mehrgasrh and Kili Gul Muhammad in Baluchistan, continued improvement in techniques, shell work developed, the forms and decoration of pottery flourished and atained new heights, and the like.

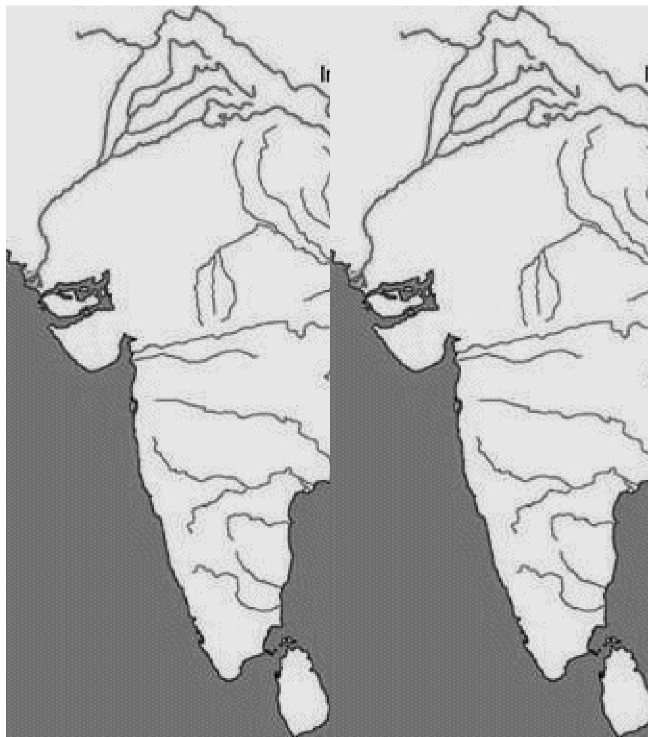
There is also good evidence from these sites for long distance trade. The Indus people were innovative craftsmen, with wide ranging contacts in Afghanistan, Central Asia, the Iranian Plateau, and Mesopotamia, from whence came many exotic materials. Internal trade and commerce involved food products, as well as raw materials and finished products. All this paved the way to the Indus civilization.

Alongsideseedagriculture,pastoralnomadism played an important role in the development of urban civilization that was to come. Based on such hard evidence as pastoral camps, faunal remains, figurines, and other imagery, cattle played a prominent role in the lives of the peoples throughout the Greater Indus Valley. The emerging picture of pre-urban Indus life indicates that many people throughout the area were mobile cattle keepers. Given the presence of related cultural styles over a wide area, we can infer a very substantial base of interaction and communication for the peoples of the Indus Valley and its hilly flanks. Intense, regular communication between diverse regions is the basis on which these cultural patterns were developed and sustained. They are also a key to understanding culture change. Taking into account these observations on interaction, it would seem to be farfetched to imagine that the immense areas and the spaces between the known pre-urban site clusters and isolates were uninhabited during this time. It is more reasonable to see them as the niches within which a very large number of pastoralists would have been present during this era. The beginnings of the Indus Age, with even larger spaces between settlements can be viewed in the same way; times within which pastoral nomadism and mobile peoples of many kinds were living. As a whole, the Indus Age may have been one that was not a collectivity of peasant farmers, but rather a complex mix of farmers, herders, hunter-gatherers, and peoples with different ways of life, depending on region and time. Moreover, settled life was not the only important theme of life during the Indus Age, since mobility and movement have their prominence too.

archaeological information provided by him and rearranging it in a format that better suits the title of this book. *The Indus Age*, as its title implies, covers only the developments immediately leading A Prelude to Civilization up to the Harappan Civilization. It is, however, no

I.2. The Land secret that the pre-agriculture, or more specifically,

the Stone Age period is as important to the understanding of ancient Pakistan as the material covered by Possehl. It is during this time period that cultural foundation of ancient Pakistan was laid. The current volume satisfies this need.



Ancient Pakistan and Historiography The story of the ancient man
Himalayan Mountains in the North box the land in. Before we move on to the main subject, one important The geographical significance of this counpoint must be madeis essentially a story of his

a priori. The history of Pakistan is
continuous adaptation to the try in understanding the origins and dispersal of invariably written in context with that of "India": at least
changing environment in agriculture and other aspects of the Neolithic cannot this has been the tradition so far. In this process, the
which he lived, survived, and be overstated, particularly since it has decisive prehistory of Pakistan has been largely ignored as though

progressed during his long bearings on the spread of settled life all over South it contributed nothing or little to the prehistory of the
journey towards civilization. region. If the 'North-West India' is to be mentioned at all, Asia. Since the prehistoric data of this landmass Environment, in turn, is can only be discussed with reference to its current it has always been portrayed as an integral part of "India",
closely related to the geog geography, a few topographical features of the land completely ignoring its much more intense, long lasting,
raphy of the land, the cli need to be reviewed and put in perspective. The and enduring relationship with Afghanistan, Iran, and
mates that prevailed, and the recognition of various geographic regions and their Central Asia and its relative isolation from the rest of the resources is also indispensable for the understand Indian natural resources that were

subcontinent. The result is
available. This interaction of
an unforgivable ing of various regional cultures that emerged as a
corruption of history, both that of India and that of
man with his land and envi result of the Neolithic Revolution in Baluchistan and
Pakistan. This Indo-centric approach to Pakistan's ancient
ronment has been studied western Sindh during the fourth and fifth millennium history also creates a number of

interpretative difficulties
very closely, especially in BC.
and does not allow the writing of a smooth and coherent
recent years, in order to map Pakistan's geography has been adequately
narration of the past; neither that of India nor of Pakistan.
his cultural development covered by several authors and many of them give
A few scholars of history have realized these problems and have attempted to
through the Stone Age and
later in prehistoric times. This is true in case of the
Indus man too.Page 2

The area that we now call Pakistan has been at the center of several cross-currents of human history, the spread of agriculture and sedentary living being one. It is a vast area wedged between Iran and Central Asia on one hand and India on the other, covering about 900,000 square kilometers of land. It spans over the vast Indus plains, which includes the province of Sindh and Punjab just short of the Indo-Gangetic Divide (now constituting the Indian Punjab and part of Haryana), the Indus Delta, which includes southern Sindh and a part of Kutch , a significant part of the Thar Desert, and the mountainous eastern edge of the Iranian Plateau (Baluchistan and the Pashtun country). These are the borders of ancient Pakistan as well although in this case we may want to push them a litte farther to the west, probably up to the Hindu Kush mountains, and expand a little more into southern Gujarat and the Divide.

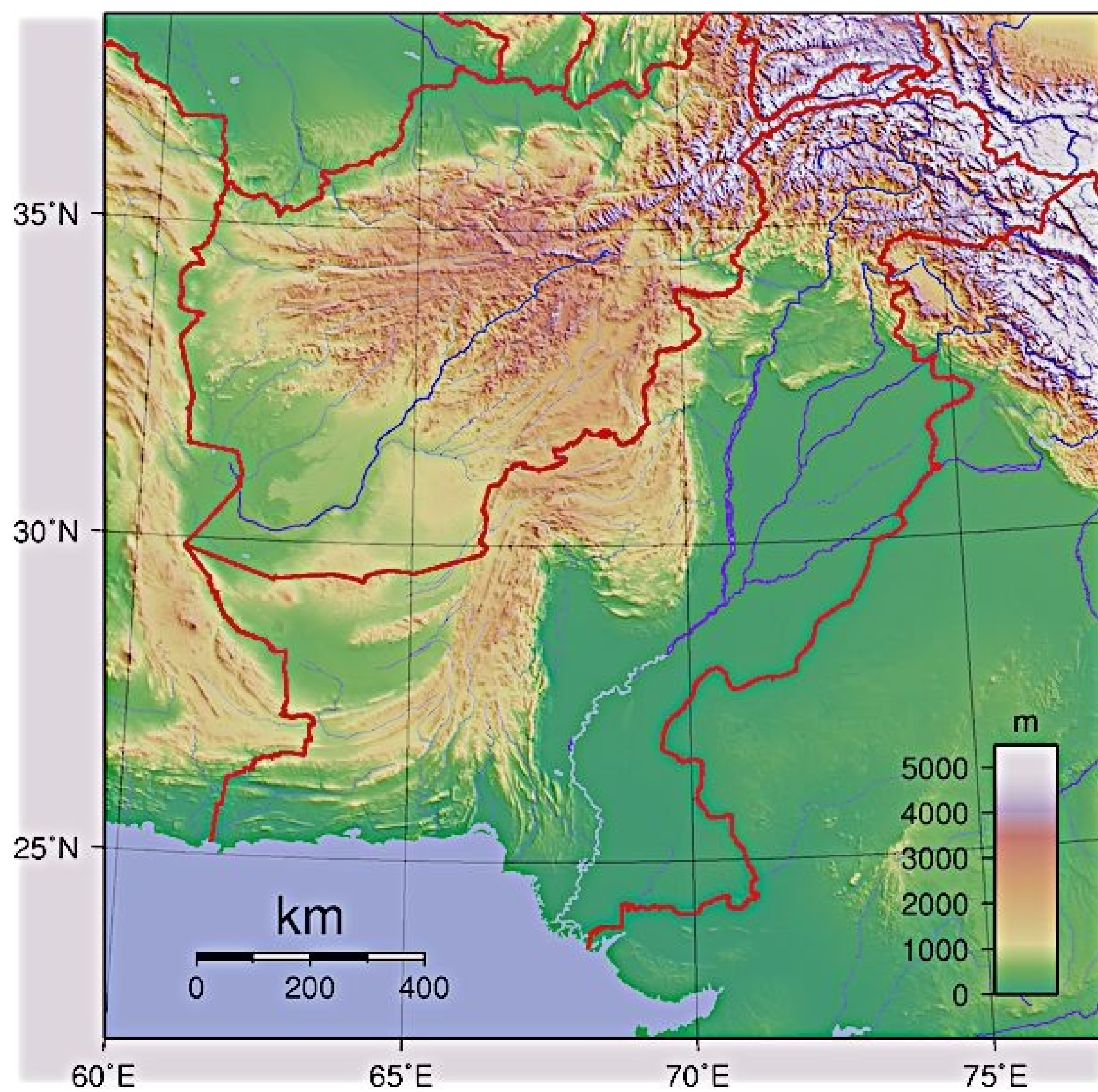
Geographically, Pakistan is a diverse country, ranging from high mountain ranges, to elevated plateaus, hill-slopes, alluvial plains, arid land, sandy deserts, coastal areas, and occasionally forested hills. It has the highest or the second highest mountain peaks in the world, but also one of the lowest earth surfaces in the salt lakes of Kutch. But, Pakistan is essentially defined by the Indus basin, which drains central Himalayas, and is framed by the Great Thar Desert in the east, and the Sulaiman and Kirthar ranges in the Northwest and the West, respectively. The Arabian Sea in the South and the
a fairly comprehensive outline of the basic physical geography of the land as it appears today. The best general coverage can be found in sources such as Possehl's monumental work, *the Indus Age (9),* as well as more general surveys (10-15). These descriptions have already been summarized in Volume I (*The Stone Age*) of this series: the following is an extract from that review, adjusted to the

need of this volume.

It is evident that the geographical features of this land in the remote past must be quite different from those of the present time. However, as a point of reference, the description of the presentday geography serves as a good starting point. It emphasizes the role played by the varied characteristics of the land, diverse array of available resources, and cultural and linguistic diversity of its people in shaping the history of this country as well as that of India, Afghanistan and Central Asia. It also shows the way in which the roots of various regional characters extend back into the early Neolithic.

Before we move any further, a point of much importance must be made. Like Europe and other major cultural entities of the world such as India or China, Pakistan has an unmistakable geographical and cultural character of its own. This may be hard to define in a few words and hard to analyze but once experienced, it is instantly recognizable. One of the underlying reasons for such a clear cultural identity is that this area has had a long history of internal development which has formed deeply rooted patterns of thought, religious and philosophical attitudes, social behavior, artistic expression, and a range of diverse but interrelated life-styles.

Also, a note of precaution must be struck: notwithstanding the paramount importance of natural boundaries in defining a country or a cultural ness, which it does not in fact possess. For example, there are a number of feasible, if arduous, routes that enter eastern Turkistan and Xinjiang province of China from northern regions and Kashmir. The most notable of these routes uses the



famous Khunjrab Pass through which the Karakoram Highway passes, connecting trans-Indus Kashmir with the high Asia. However, neither this nor any other of these northern approaches has played any dominant role in the formation of Pakistan's culture or materially affected its history. Their importance lay rather in the reverse direction: they were among the chosen channels for the diffusion of Buddhism and certain aspects of Buddhist art from Pakistan to Central Asia and China during the early centuries A.D. Some routes between Peshawar and Chitral lead to the Pamirs. There were two major central Asian trading marts beyond the Pamirs – Kashgar and Yarkand – which were reachable through these passes. There were routes to Central Asia from the direction of Leh in Ladakh as well, skirting the foot of the high peak of Muztagh Ata. Mention must be made here of

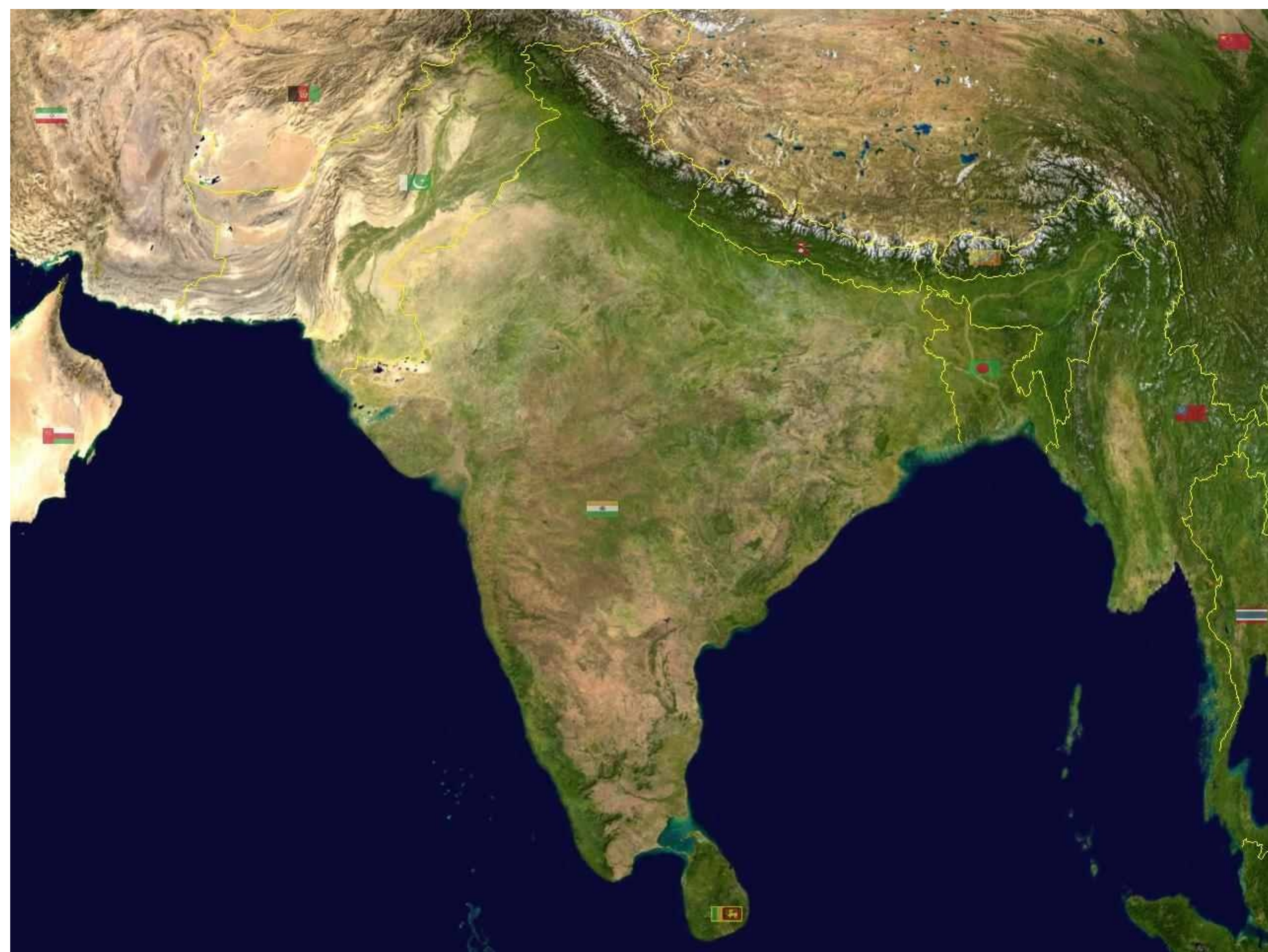
Topography of Pakistan

region, one must keep in mind that the terms 'boundaries' and 'borderlands' in archaeology and prehistory denote something wider and more fluid; and it is in this context that the historical and prehistorical issue must be discussed and examined. For our purpose, as stated before, we are dealing here with an area, which is generally known in archaeological literature as the *Greater Indus Valley.* This area spans from the Ghaggar-Hakra river basin and the Indo-Gangetic Divide in the east to the far end of Baluchistan and the entire stretch of the Sulaiman Mountains, with their numerous passes. Its northern boundaries are in Kashmir and its southern borders are defined by the Arabian Sea, starting from the coastal Kutch to the farthest end of the Makran coast. These boundaries more or less

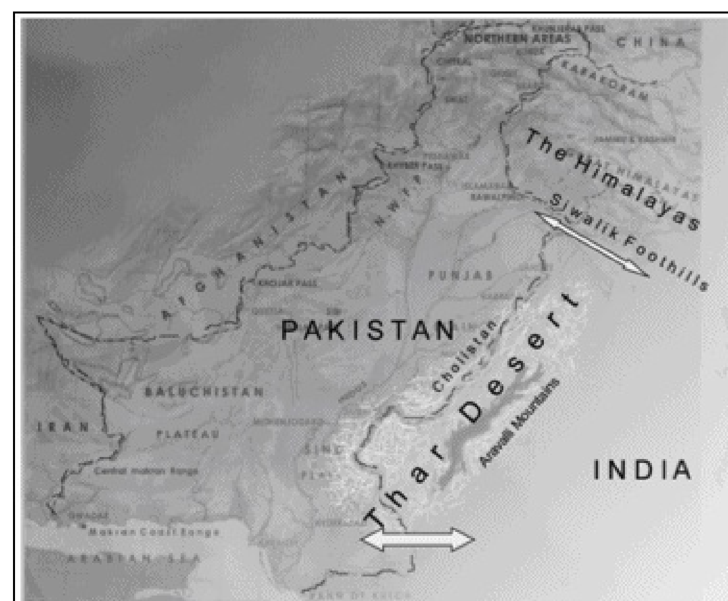
describe the political boundaries of modern Pakistan also.
PAKISTAN

INDIA

Defining Geographical Pakistan: For defining the geographical Pakistan, we first need to define its natural boundaries. Let us begin in the north. At first sight, the formidable mountain ranges of the north give Pakistan an aspect of exclusive



Map of the Indian subcontinent, showing the Thar Desert and a hypo thetical line of separation between India and Pakistan



Two communication corridors between ancient Pakistan and continental India. Note the intervening Thar Dersert, which forms an effective barrier between India

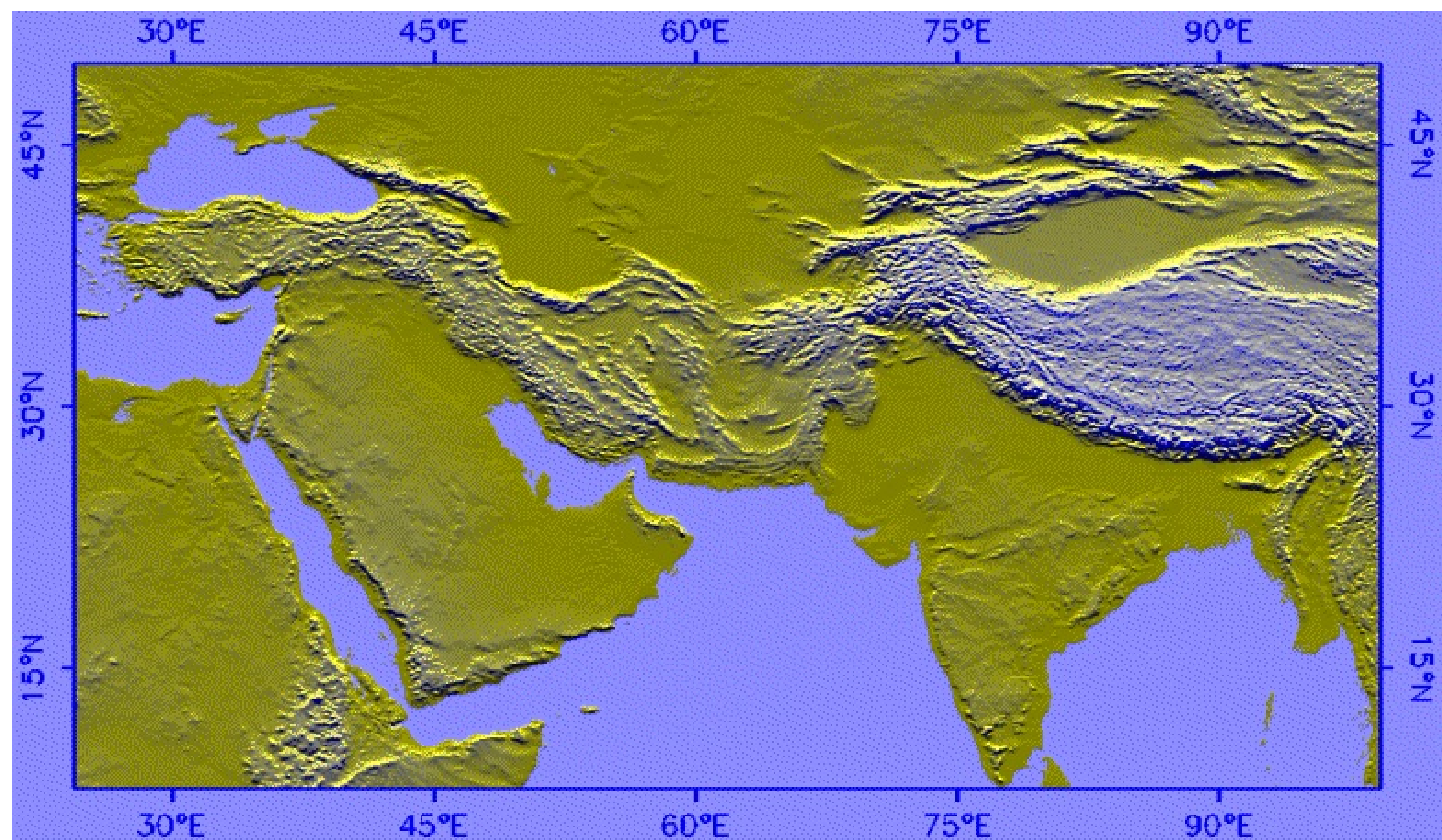
and Pakistan

east. Jewni, Ormara, Pasni, Sumiani, Dhab, and several other minor ports serve fishing villages along the coast. A look at the map suggests Pakistan‘s central role in any traffic in the Arabian Sea. The Indus delta has been traditionally linked with the Gulf, so have the other ports along the Makran coast. The coastal regions in the west enjoyed traditional mercantile intimacy with the east coast of Africa, from where the Indus man probably learnt the cultivation of millets (*bajra* and *jawar)*. These proved to be important crops for the summer months in the later part of the Indus Age.
South of the Himalayas in the present-day India lay the Great Ganga-Yamuna plains with an average width from north to south of some 200 miles and an average height of 500 feet above the sea. The prehistory and much of the history of the two plains, that is, the Indus plains on one hand and

the fact that all these routes across the Karakoram, and at least the main ones which went to northern Afghanistan, were feeders of the famous Silk Route which went all the way from China to Rome in the early years A.D. Another fact, which calls for attention is that the routes across the main Hindu Kush massif in central Afghanistan were closely linked with the routes moving into, or coming from, ancient Pakistan. It was along such routes that Buddhism spread to Central Asia and there are many Buddhist statues and painted caves
standing sentinels along
these hills and desert paths. The famous Buddha images of Bamiyan in the Hindu Kush (some of them demolished by the Taliban Government in Afghanistan), the sensuous ivories of Bagram in the Kabul region, the caves of the Thousand Buddhas at Dun Huang at the edge of the Taklamakan desert
- these are only some of the beauteous things marking the trail of merchants, monks and pilgrims along these routes, linking Pakistan to the far reaches of Chinese Turkistan.

Looking to the South, there is a long coastal strip at the Arabian Sea, locating several seaports such as Gwadar in the West and Karachi in the

Zagros Alburz AfghaniIran
Pakistan



Topography of the Iranian Plateau

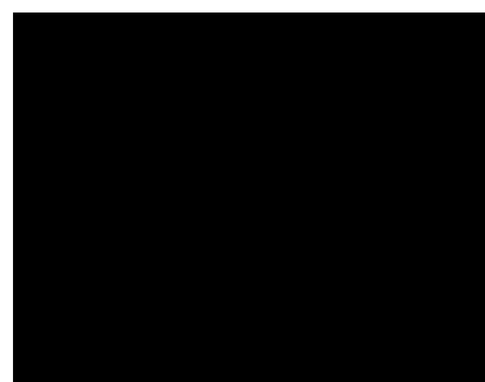
the Ganges-Yamuna plains on the other, in spite of their superficial continuity on the map, is strikingly different. Without going into details, it should suffice to note that the land of the middle and lower Indus is barred from the plains of the Ganges and Yamuna as well as the Peninsular India by a vast desert, the Thar, of which Cholistan desert in Pakistan is a part. At the eastern end of the Thar Desert is the mountain range of Aravalli, which runs northeast to southwest and separates Pakistan from Central India as well as from the Peninsula. These two geographic impediments, the Thar and the Aravalli, formed a fuzzy line of separation between India and Pakistan and kept the populations of the two regions more or less apart from each other for much of the prehistoric time. This demarcation line runs from the west of Delhi in the north, that is, IndoGangetic divide, to Kathiawar in the south (see the map below). It is therefore not surprising that the eastern boundaries of ancient Pakistan were along this line. What is surprising, however, is the fact that the political boundaries between Pakistan and modern India also run more or less along the same separation line. Thus, it seems as though Nature itself ordained the eastern boundaries of Pakistan as much as it did those in the West, the South, and the North.

Although Pakistan, as a geographical entity, was largely cut off from the area that now forms the Indian Union for the presence of the intervening desert, the Thar, the marshlands in the north-east, and in the Indus Delta in the southeast, some limited contacts between the two regions was definitely possible. There are some signs of these contacts during the Paleolithic between north India and northeastern parts of Punjab through a narrow corridor all along the foothills of the Siwalik hills and there are definite signs of contact between Gujarat and southern Sindh along the coastline and the southern edge of the Thar. It is through these two narrow corridors that wheat-barley-sheep-goat culture spread into neighboring areas of India. These contacts expanded to a considerable extent in the second millennium B.C. when the Indus farmers and pastoralists started moving into the Gangetic plains. By the end of the first millennium, the Indus Valley was playing the role of ‘middleman‘

between the great landmass of India and equally great landmass of cepntral Asia and the West. The general affinity of the peoples remained with the west but the east started to play an equally important role in the cultural development of this region.

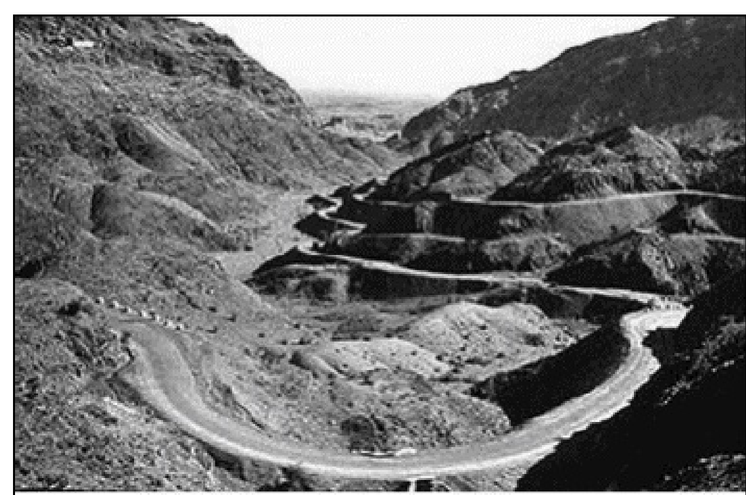
Pakistan‘s western borders, i.e. between southern Baluchistan and Iran and between northern Baluchistan and southern Afghanistan, are also quite interesting. They are directly connected with the topography of the Iranian plateau of which Baluchistan is a part. Iranian plateau has played a crucial part in the ancient history of Pakistan. It is a block of land that intervenes between the Fertile Crescent countries of the Tigris-Euphrates Rivers and the Indus Valley. The plateau is essentially a vast basin with broad mountain chains thrust up at its rim, isolating the interior from the surrounding regions such as central Asia and the great river valleys of the Indus in the east and the TigrisEuphrates in the west. The interior of the plateau is made up of sub-basins and deserts with interior drainage. On the east the basins are squeezed between the Koh-i-Baba mountain ranges of central Afghanistan and the coastal ranges of Makran on the Arabian Sea. The Koh-i-Baba merges in the Hindu Kush and the Pamir-Karakoram-Himalaya chain on the east, while to the north of central Iran, the Elburz Mountains intervene between the Great Salt Desert and the Caspian Sea, merging with Caucasus on the Northwest. The Zagros Mountains are a southern offshoot joining Th.e Caucasus to the coastal range of the Persian Gulf and the Arabian Sea. Only on the Northwest, where the hills are lower and phase down into the spacious plains and deserts of Central Asia, is the plateau rim less well defined by geography.

Too far to the west to be affected directly by the rains of the monsoon and too far to the east to be affected strongly by the Atlantic and Mediterranean, the Plateau is largely an arid land. It will be shown that the Plateau‘s rim somehow constituted the area where man first domesticated plants and animals, starting an agricultural revolution in the ancient world. Baluchistan is the eastern rim of the plateau and it actively took part in this important phase of human history. We shall talk a lot about this region within the body of this book as this region was indeed the agricultural hearth of ancient Pakistan, if not of the whole South Asia. We shall notice that the Pakistani Baluchistan is a part of


Coastal Makran and the Indus Delta

Iranian Baluchistan and that there were no high mountains between them. However, large deserts and desolate areas intervene between Iran and Baluchistan and consequently there is not, and there has not been in the past, any significant direct links between these two countries through Baluchistan. All cultural contacts or any technological exchange, which could have been taking place, materialized through southern Afghanistan. There are two major lines defined by the location of deserts in Iran and Baluchistan. The first is along the Kech valley beyond the Makran coastal range, and the second follows the alignment of the Chagai hills through the desert and eventually reaches Quetta. Thus, the natural boundaries between ancient Iran and ancient Pakistan were almost the same as they are political to day. These routes have been further defined and described in Chapter VI.6.

On the northwestern frontier of Pakistan, there are high mountains all along the borders but for various passes they are not an affective barriers. Here the pastoral routes into or out of Pakistan are many and some of them are still frequented. These routes generally converge on the Khyber Pass, which has been a major traffic axis since the establishment of Peshawar as a metropolis, the ancient *Purushpur*, about 100 A.D. No doubt, the Khyber Pass must have played an important part in the communication between Pakistan and Central Asia in facilitating the movements of men and beasts. In fact, there is strong evidence for the movement of men from west to east at the beginning of the present interglacial period some 15,000 years ago and probably earlier, during the Middle Paleolithic some 40,000 years ago. There is plenty of literary evidence that supports the movement of nomadic pastoralists from central Asia as early as 4000 years ago. The Vedic people, the so-called Aryans, were one of these migrants at a later date. In the historic times, there were other peoples who invaded Pakistan or simply came here to settle and became an integral part of the Indus stew. The Bactrian Greeks, the Kushans, the Mongols, the Turks, and the Persians readily come to mind.


A view of the Khyber Pass between Pakistan and Afghanistan

An important earlier route from the northwest follows a more northerly and quite devious line along the Kabul River to Charsadda, the ancient *Pushkalavati*. This route connected the upper Indus Valley with Bactria and the modern Mizar-e-Sharif across the Hindu Kush passes. This route also played an important role in shaping the prehistory of Pakistan as well as that of central Asia. South of the Khyber Pass are a number of alternative alternative tracks which have been used and are still used; the most important being the Kurram valley and the Peiwar Pass. Still further south, the Tochi, Gumal and other valleys carry ancient thoroughfares from the direction of Ghazni and Kandhar uplands to the Derajaats and the Zhob valley. The Zhob valley carries or carried a modest traffic north to northeastwards from the direction of Quetta, itself the northernmost of the three focal points; others being Kalat and Las Bela. Southeastwards of Quetta a route enters the Indus plain via Sibbi. Westward from Quetta is a camel route that leads towards Kirman and southern and western Iran. At the southern end Las Bela, now an insignificant Baluch town, must have stood full in the tide of human immigration into Pakistan for centuries in the past.

We have then a geographical picture of a region mainly barred from the North and having restricted approach to the East and the West but accessible in the Northwest to the plodding traffic of Asia from the northern rim of the Iranian plateau and the Oxus valley. Commerce, migration and invasions have recurrently come in this way in historic times. Similar movement is implicit in our ancient and prehistoric evidence covered in this volume. As much as Pakistan was isolated from the rest of the subcontinent, it had limited access to Iran. And, as this piece of land was connected with modern India

through two narrow corridors, it was connected with Central Asia through a few narrower passes across an almost interminable mountain range. The passage to the north, across the Himalayas, was even more difficult. Thus, Pakistan is marked out as a geographical and cultural unit no less by nature than by man.

This emphasis on the western borderlands as the source of population, new ideas, raw materials, and objects makes all the more important an awareness of the cultural sequences in such regions as Afghanistan, Iran, and western Central Asia. If the geographic premise is considered in its broader sense, then the cultural developments in those regions have a great bearing upon the cultures of adjacent Pakistan. Similarly, the technical and cultural developments in ancient Pakistan must have a direct influence on the adjoining areas in the west and the northwest, especially Afghanistan, Siestan, and western Turkistan.

The Frontiers and the Interaction Zones: The boundaries of modern nation states are not the products of geography alone: they are the results of various historical situations. Oftentimes, they constitute the cultural and genetic interaction zones. Thus, the term 'frontier' in archaeology denotes something much wider than any politically motivated line would denote. It reflects a shaded territory which may be somewhat ill-defined on the ground but is broadly indicative of a transitional zone between two major geographical or cultural areas. This tends to denote sections where the influences from both the flanking geographical areas have been historically operative. On a general level, the frontiers are basically interaction zones. Theoretically, such interaction zones – areas of geographical and cultural transition – are available all along the western, northwestern, northeastern and southeastern boundaries of Pakistan. However, not all these zones have been historically significant to an equal extent. From the point of view of Pakistan's history, it is the western frontier which is most significant. It was here that the worlds of central Asia and Iran met the world of "India" in its generic terms.

The northwestern frontier as an interaction zone is fairly wide and covers the southern part of central Asia (especially, southern Tukmernia and northern Afghanistan) and the eastern rim of Iran which runs from Meshed in the northeast to Zabul and Zahidan in the Iranian Siestan. Both politically and economically these areas constitute a single interaction zone. Politically, the entire area was unified many times in the past. In other periods it was politically fragmented, a process subject to both local and central and west Asiatic factors. Almost all invaders and immigrant groups belonged to this area.

Another element which binds Pakistan to the West is economic interaction, a fact which is archaeologically and historically well documented. Even now, every winter there are large-scale movements of *Powindah* nomads from Afghanistan to Pakistan. While coming they bring goods from Afghanistan, and on their return journey they carry goods from Pakistan. Such subtle movements of populations have all too often been ignored.

The second important interaction zone is along the borders of Pakistan with India and to understand the geopolitical factors in operation it is important to know the nature of a dividing line which one draws joining the west of Delhi, the Aravalli hills and the Gulf of Cambay. As mentioned before, this line, running through the middle of the Thar Desert, geographically separates Pakistan from the bulk of India. In one sense this marks a natural barrier to the cultural, technological, and even genetic interaction between the Indus Valley and central India but in another sense this carries the thrust of the western cultures to the Ganga-Yamuna plains. This is a kind of marchland where the influences

emanating both from the western parts of the Ganga-Yamuna plains and the Indus Valley have been operative, although mostly through a narrow corridor along the Siwalik hills. A similar situation existed in the south where across the wasteland of Kutch and along the coastline of Sind a robust interaction zone came into being. Genetic composition of today's populations in these borderline areas goes to prove this point, so does the diffusion of agriculture from the Indus Valley to the Ganga plains in the third and second millennium B.C.

All three of these interaction zones are important for the time period covered in this volume. The western zone is important for the receiving cultural elements from the west and the eastern zones for spreading some of these western as well as the indigenous Indus cultural traits to northern and western India.

Geographical Features of the Land: Geographically, Pakistan can be divided into five principal divisions of archaeological significance: (1) the eastern slopes of the Iranian plateau, represented by Baluchistan, Sindh Kohistan, the Kirthar, and the coastline; (2) the Indus plains, including the fringes of the Thar Desert, as well as the delta area; (3) the foothills of the Sulaimans and the Derajat, up to the Khyber Pass; (4) the Siwaliks, the Pothwar Plateau, the Peshawar Basin, and the Salt Range; and (5) the so-called 'northern areas' in the shadow of the Pamirs, the Karakorams, and the Himalayas mountains. For cultural and historical reasons, we may add two more areas to this list. These are (i) Indo-Gangetic Divide, constituting parts of Indian Punjab and Haryana; and (ii) Kutch and the adjoining areas of Gujarat as well as that of southern Rajasthan. Of these Baluchistan and western Sind are of particular significance for the purpose of this volume, although the foothills of the Sulaimans and northern Punjab also become important in later stages of Pakistan's prehistory. This is not to say that upper Indus Valley is not of any interest for us: we shall examine the Neolithic sites and early agricultural villages in and around Cholistan at the fringes of the Thar.

The Baluchistan Plateau and the Associated Area: The Baluchistan Plateau and the western highlands is truly the largest area of Pakistan, desolate, dry, sparsely inhabited, and divided into selfcontained valleys and internal drainage systems. The rugged and desolate character of these highlands is accentuated by the extreme sparseness of vegetation. In spite of the altitude, rainfall is scanty. Nevertheless, at places some water is available all the year around which affords adequate grazing to sheep and goats and to support some isolated population knots. A noteworthy feature of these hill ranges is the development of gravel slopes at the base of the hills, forming a piedmont zone between the highlands and the plains. Whenever it rains - which is not often – the torrents fan out on vast areas of the plains downhills. This provides moisture for vegetation to grow and provide some subsistence for domestic animals. Some of these locations may provide enough moisture for date palms to grow and make some rudimentary agriculture possible. It is at these locations where earliest settlements of mankind arose in South Asia. One such site of archaeologically immense importance is Mehrgarh on the border of Baluchistasn and Sindh, in the Kachi plains. We shall deal a lot with this region within the body of this book as this region was indeed the agricultural hearth of the whole South Asia.

At the northern head of the Bolan Pass is Quetta. Here the mountains swing north and east in concentric loops crowned by fairly high peaks. Northward, the Sulaimans form the homeland of the Pathans or the Pashtuns. The aforementioned northern passes of the Gomal, the Tochi, and the Khyber are in the Pushtun country. Mehrgarh, mentioned above, lies at the western edge of the Gomal pass.

An equally distinct tract, known as the plain of Las, the Las Bela, extends about 90 km northwards

from the seacoast. It drains an area of considerable magnitude in Kohistan and is composed of alluvium deposited by the Porali, Hab, and Malir Rivers. This region has been quite important in prehistory as it boasted an extensive pre-urban civilization, called the Kulli culture, during the fourth and the third millennium BC. To the west, along the Arabian Sea, is coastal Makran, offering a number of sea ports and fishing villages. This is a desolate country, little potential for agriculture, and very sparsely populated. Nevertheless, it played its role in cultural development of the Greater Indus Valley by connecting, most likely through coastal traffic, with southern Iran.

Yet another potential agricultural area lay about Lake Manchar. This is the largest freshwater lake in Pakistan, in fact in the whole of the subcontinent. It was, and still is, the repository of water spilling from the flood channels of the Indus. During periods of inundation, it covers an area of over 500 square km but shrinks to a mere 35 sq.m. as a result of post-monsoon drying.This periodically changing level of water thus affords an excellent arable land for cultivation, especially for the *rabi* crop. In the proximity of the Manchar Lake, we find a series of hot water springs, which also afford opportunities for food production and animal grazing.

The Indus Plains: The Indus plains can be conveniently divided into two parts: the lower Indus plains which is a relatively narrow east-west strip about 200 km wide, contained by the Thar Desert on the east and the Kirthar Range on the west; and the upper Indus plains, practically comprising of the Punjab and the Peshawar Valley. The Indus tributaries - the Kabul, the Swat, the Jhelum, the Chenab, the Ravi, and the Sutlej, dominate the area of the upper Indus Valley. It is a large area but surprisingly it did not play much of robust role in the development of pre-urban cultures in the region. The area around the Ghaggar-Hakra river, now dry, is, of course, an exception. A truly large number of preurban settlements have been found in this river basin, some of them developing into urban center in the third millennium BC.

The Lower Indus valley as we see it today is an extremely arid region totally dependent upon the Indus to sustain human life. The Kirthar range separates the plateau of Baluchistan from the plains of Sind. A large part of the Indus plains is a desert or near desert which, in world terms, forms an extension of the Persian desert. These dry plains extend all the way to the Aravalli hills in India across the Thar Desert. The Cholistan Desert in the north of Sind and the southeastern Punjab is a part of the great Desert, the Thar. As in the Thar, there are indications that it may not always have been quite so arid, and that areas along the northwestern margin of the plain in particular may have been able to support grazing animals and sustain dry cultivation in a way that is not possible today.

The borderline areas of the Great Desert, i.e., the fringes of the Thar Desert, are important in archaeological terms: Bridget Allchin calls these areas the *Dry Zone*. It is a low rocky plateau or an undulating plain from which rise widely spaced groups of low-lying dry rocky hills. Between them, in places, there are dune fields consisting of rows of sand dunes sometimes a hundred feet or more in height, running approximately at right angles to the prevailing southwesterly wind. Formed by the wind, before which they are very slowly advancing in a northeasterly direction, they look like giant waves on the sea. Elsewhere there are great stretches of sand interrupted here and there by small rocky hillocks and by shallow valleys in which streams flowed in the past at times when the climate was somewhat less arid than today. The 'dead' drainage systems of the Thar are of great interest to archaeologists, as they give a clear indication that it was not always as arid as it is today. This and other evidence, both archaeological and geomorphological, show that at times in the past, the Thar has been a more hospitable region both for grazing animals and for people.

Life in the plains of Sindh or the western fringes of the Thar Desert in general is not as desolate as it sounds, thanks to a major perennial river, the mighty Indus, and several smaller and seasonal water streams to its west. Today, the Indus irrigates a vast area of the dry land of Sindh. It also supplied the life-giving water to humans and their ancestors who inhabited this area in the remote past. Because of this extremely favorable situation, we find a large number of archaeological sites all along the Great River and around the various lakes which may have presumably been fed by the river water through regular inundations.

To the south-east of Punjab and the northeast of Sindh lies the dried-up drainage system of the Ghaggar-Hakra. These channels are now dry . In rainy seasons they often come alive but disappear in the desert of Cholistan, soaked up by the thirsty sand. Once in a while, water flows in the old channels up to lower Sindh, where they are called Mehran. This drainage system, which most of the Indian scholars prefer to call 'Sarasavati' to make the implicit connection with a mythical river of the RgVeda, has left an extensive archaeological record on its banks; its former course is marked by abandoned settlement sites of Harappan and preHarappan sites.

The Siwaliks, the Pothwar Plateau, the Soan Valley, and the Salt Range: The Siwalik Hills, also known as the Outer Himalayas, are the southernmost and geologically youngest east-west mountain chain of the Himalayan system. They extend 1,600 km from the northern Punjab and Kashmir eastward through Nepal extending as far as Assam. There are vast networks of small hills and channels to form streams which are ephemeral (transient) in nature. The Siwalik Hills are chiefly composed of mudstones, sandstones and coarsely imbedded conglomerates, and conglomerate formations which are derived from the Himalayas to the north during Middle Miocene to Middle Pleistocene times. Ongoing erosion and tectonic activity has greatly affected the topography of the Siwaliks. Their present-day morphology is comprised of hogback ridges, valleys of various orders, gullies, choes (seasonal streams), earth-pillars, rilled earth buttresses of Conglomerate Formations, talus cones, watergaps, and choe terraces. Associated badlands features include a lack of vegetation, steep slopes, high drainage density, and rapid erosion rates.

Pothwar is an extension of the Siwalik Hills, in the north of Punjab. It is an elevated plain, a plateau, situated between the rivers Indus to its north and northwest, and Jhelum to its east and southeast. Its north is squeezed between the subHimalayan mountain ranges of Murree-Abbottabad with lesser Margala Hills with height of 1200 meters. Its south is bordered by the Salt Range with major heights of 1054 meters near Pai Khel and 1522 meters at Sakesar with gradual decrease towards east.

Besides the Indus and the Jhelum, there are other small rivers, admittedly less in water content but decidedly more important historically. Haro, Soan, and Kanshi meander through its hilly landscape. These rivers are fed by water streams, some of which are perennial. All these rivers and water streams are lifeline for this region, on the banks of these are situated several cities such as Attcock, Rawalpindi, Chakwal and Jhelum. Several other large villages and towns also flourish in this area, using the syncline and flood-pain for agriculture. beyond one German expedition that primarily explored the remains of the Gandhara culture and traced the footpaths of the Buddhist travelers in historic times. From the point of view of the study of the Neolithic, this area is rather barren and of little interest to us at the present time. This is a rugged area, high mountain peaks, generally of extreme cold, and at places infested with glaciers. In the Ice Age, it would have certainly been an area of very low interest for the early man to inhabit.

Rivers: The Indus and its tributaries have





The location of Pothwar region

A view of the topography of Pothwar

Most of the area is, however, without water except that which becomes available in the form of some meager rain in summer and still less in winter.

Northern Areas: As far as the 'Northern Areas' are concerned, practically no archaeological work has been done in this region, played an important role in the economic life of Pakistan. In its lower reaches, typically in Sindh, the Indus tend to build up its bed with material it has not the strength to carry, and is subject to seasonal or flash flooding and frequent lateral movement of its channels. In the regions of Punjab, Pothwar, and the foothills of the Sulaiman, the rivers – all of them the tributaries of the Indus – are more stable, flowing in firmly incised channels. Some of them even tend throughout the major part of their courses to cut down rather than build up their beds. To our interest, the river Soan in the Pothwar Plateau is one such example. Apart from this difference, the story of Pakistan's geography is essentially the story of the Indus.

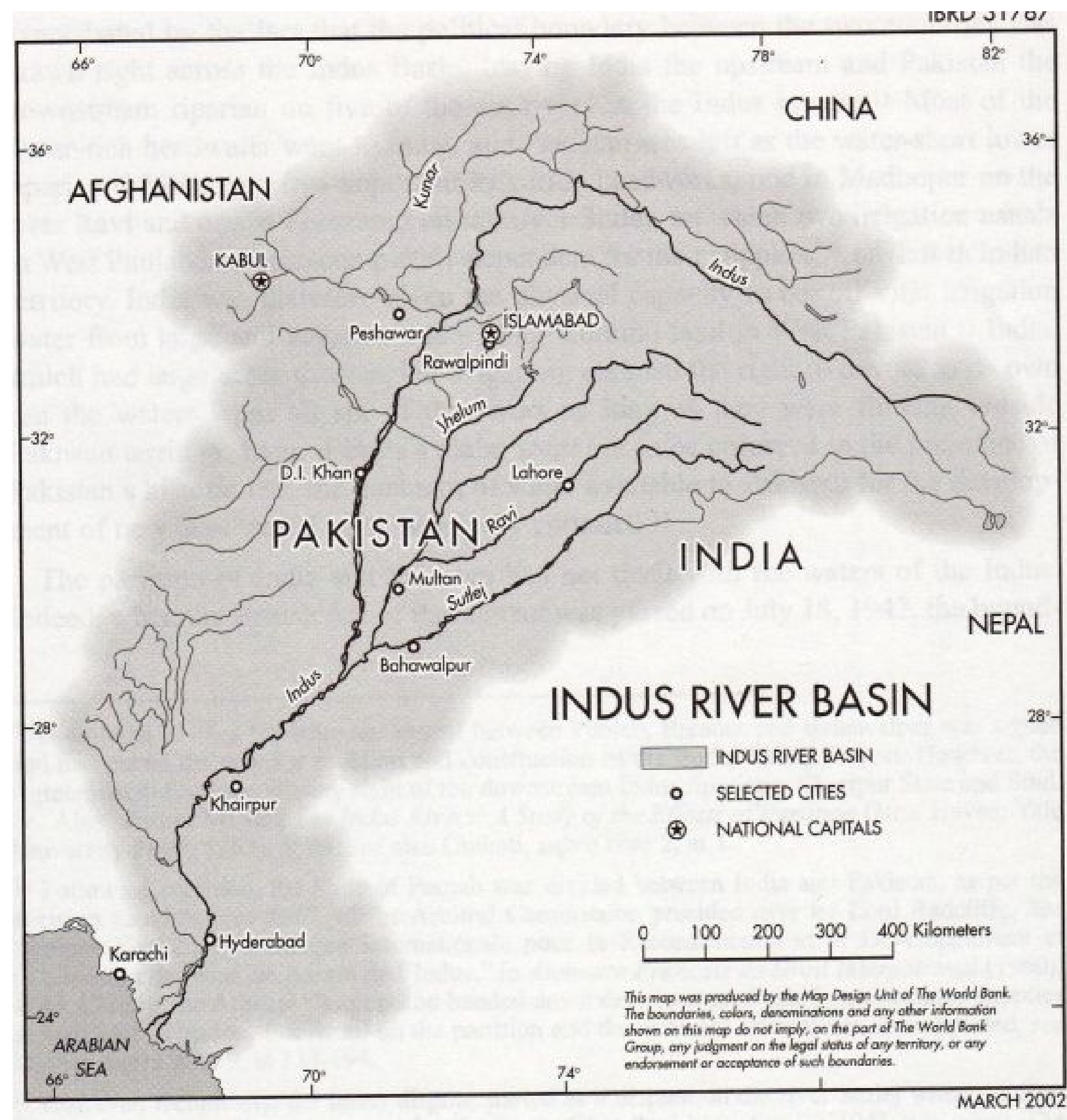
The Indus rises in south-western Tibet, and flows between two ranges of the inner Himalayas, in a

northwesterly direction until it meets the Gilgit River flowing in the opposite direction down from the Pamirs.

There the Indus turns south-westward, and makes its way through the high mountains. In the first half of its course through the Himalayan and Karakoram ranges, it retains the character of a gorge-enclosed river till Kalabagh below Attock at the border of the Pashtun country and Punjab. Near the point where it enters the plains it is joined by the Kabul River, flowing out of the Afghan mountains to the north, fed by winter rains and melting snow. In the Punjab, it receives the water of four major tributaries, the Jhelum, Chenab, Ravi and Sutlej, all of which rise in the outer Himalayas and are snow and rain fed like the Indus. The Jhelum flows through Kashmir before coming down to Punjab. The Jhelum and the Chenab unite and their combined flow meets The Ravi. The Beas flows into the Sutlej within the Indian borders, the combine water then joins the Indus within the Pakistan‘s borders. However, most of the water already have been siphoned out within the Indian territories, it is now practically dry.

T h e I n d u s also continues to receive water from a series of minor rivers, such as the Kuram, flowing from the northwestern mountains, and fed primarily by winter rains. Similar rivers continue to emerge from the mountains on the final part of its course through Sindh. Today, they tend, like the Bolan River for example, to lose themselves in the silts of the plain before reaching the Indus but there is evidence that even five thousand years ago the Bolan, and probably other streams, carried sufficient water to flow directly into the Indus.

The Indus in its lower course flows through an area of extreme aridity with a rainfall



Just as Egypt is the gift of the Nile, Pakistan is the gift of the Indus. Compared to Egypt, however, the Indus basin covers a much larger area

unstable river inclined to build up its channel and change its course frequently. There is ample historical, geographical, and archaeological evidence to show that this has happened repeatedly during historic and prehistoric times, and it has been ably discussed in all its aspects by Lambrick (16,178,18) and others. Flying over the Indus in a small aircraft brings home the recent instability of the river dramatically. The present channel is shallow and frequently braided to form a bed many miles in width, and the surface of the plain from the Kirthar Hills on the north-west to the edge of the sand dunes of the Thar desert on the south-east is covered with old channels and cut-off meanders, some of which

clearly still serve as spillways, flood channels and distributaries of the main river. The Indus is known to h a v e s h i f t e d i t s channel across the entire width of the plain at more than o n e p o i n t i n i t s course through Sindh during the last three thousand years and probably did the same in earlier times. A change in the course of the main channel would lead to changes in the areas of the plain subject to inundation, and such a shift would have locally disastrous effects on human settlement and agriculture, as it did in 2010.

Continuous deposition of silt by the Indus and its tributaries has resulted in the steady building up of

steady building up of

the plain as a whole. How rapid or how regular the 177 mm at Hyderabad in lower Sindh. The monprocess of sedimentation has been is a matter of soon in Sind is unreliable, and for years together discussion. The authors of the UNESCO report on the rainfall may be well below the average, which is the preservation of Mohenjodaro (1964*)* estimate maintained by occasional exceptionally heavy rains. that the bed of the Indus and the level of the plain The fertility of the plain, therefore, is due almost itself have risen between four and five meters since entirely to the water of the Indus and its western Harappan times (ca. 2300-1750 B.C.), that is to say tributaries such as the Bolan. Today the water is roughly five meters in five thousand years. Lambrick distributed by means of extensive canal irrigation (18), considering the whole question in relation to systems, but in the past the Indus has watered its the depth of occupation at Mohenjodaro, and the plains by inundation in a manner comparable to the antiquity of the lowest pre-Harappan levels there, Nile. argues in favor of a more rapid rate of accumulaSilt deposition and flooding that make the tion, perhaps almost twice this.

plain so productive render the lower lndus a highly From the point of view of the early archaeology and prehistoric geography of the Indus valley the precise rate of sedimentation is not so important as the fact that it has been on a scale sufficient to have brought about some change in the landscape since Harappan times. This appears to be the continuation of a process that had been going on for some time before the foundation of Mohenjo-daro, probably throughout the Holocene, indicating that the environment which the valley offered to early settled agriculturalists, and before them to the Stone Age hunting-gathering communities, differed progressively in certain respects from that of the present.

In view of the unstable nature of the Indus, and the rapidity with which the plains have been built up during the Holocene, one can only assume that many archaeological sites may have disappeared in the course of time, swept away or submerged in alluvium, and that those remaining reasonably intact are on exceptionally well chosen locations. Perhaps more surprising is that *any* Harappan or other early sites have survived at all.

In areas of very low rainfall such as Sindh and the south-western Punjab, life depends entirely upon rivers bringing water from regions far away. Settlements, whether villages, towns or cities, are located close to rivers and water streams on which they are totally dependent for agricultural purposes and perhaps even for domestic water supplies. Any change in the course of a major river can be devastating, whether it sweeps away a settlement or moves away from its bed, leaving the inhabitants and their fields without water. Archaeological evidence in Sindh tell us only a partial story.

The most important feature of the plains for early agriculturalists, as for those of today, was the constant flow of the Indus through the desert, bringing an apparently endless supply of sweet, nonsaline water. The combination of annual inundation, providing water and a new layer of rich alluvium, and an arid climate that tended to inhibit plant growth over much of the inundated area during the rest of the year, made intensive cereal production possible with the limited equipment of the Neolithic farmer. This is what made the alluvial plains so peculiarly attractive to early agriculturalists and allowed them to support the Harappan towns and cities of the third to second millennium BC, following what can now be seen as a long period of earlier settlement prior to this. Thus, the Indus Civilization was very much a child of the Indus river system as ancient Egypt was that

of the Nile.

I.3. Post-Pleistocene Environment



This volume is set against a backdrop of changing climates from the cooler, drier Ice Age to the moister and warmer climate of today. With climatic change at the onset of the Holocene *ca. ca.* 12,000 years ago came a radically different distribution of plants and animals. It was the time period when the domestication of some of these was attempted by humans. It

was shortly after that food production and sedentary living became commonplace over a large part of the known world. Without an agricultural base, there would have been no massive increase in population, no development of urban centers, craft specialization, social stratification, extensive trade networks, and other hallmarks of "civilization". Without agriculture, the Industrial Revolution would never have happened. Climate evidently played a critical role in this revolution.

This close relationship of ecology with prehistory has been ignored for long but is increasingly coming in focus in recent years. As a result of this interest a large amount of geological and oceanographic data has accumulated around the world during the past century. The research in Pakistan has been limited but whatever work has been done, ties up with the picture developing elsewhere. In this chapter we are chiefly concerned with the climatic changes which ancient Pakistan may have experienced with the end of the Pleistocene and onward into the early part of the Holocene. Our main interest lies in the environment of the Holocene but the study of the early Holocene cannot be divorced from that of the late Pleistocene and hence a few remarks about the latter are essential.

Pleistocene and the Ice Age: The Pleistocene and the Holocene epochs denote geological time; the former nominally begins about two million years ago and ends *ca.* 12,000-15,000 years ago, when it gives way to the Holocene. The Pleistocene may be thought of as a series of ice ages, with glaciations lasting many thousands of years, separated by interglacial intervals of somewhat shorter duration. While it takes some 50,000 to 100,000 years to build up an ice age, it takes only 10,000-15,000 years to destroy it. The last Ice Age reached its maximum extension some 20,000-22,000 years ago, and met its end some 10,000-12,000 year ago. This chronology may or may not apply equally to tropical and sub-tropical areas, but we can safely assume the general pattern to be in parallel: the absolute dates and durations may, of course, differ from region to region.

Each glacial advance tied up huge volumes of water in continental ice sheets 1500–3000 m thick, resulting in temporary drop in sea level over the entire surface of Earth. The large amounts of water tied up in continental ice sheet also caused the dry zones to expand and desert areas to be formed.

During the interglacial times, on the other hand, the reverse happened: sea level rose and drowned coastlines were common. During this time, deserts shrank and the atmosphere was somewhat moister. Bridget Allchin and associates (14,20) have studied this phenomenon in the Thar Desert and identified at least three alternating 'dry' and 'wet' periods in Rajasthan (Indian side of the Desert) and Sindh during the Pleistocene and early Holocene. These changes had profound changes in culture development on the two sides of the Great Desert in subsequent time and have decidedly affected the spread of agriculture in eastern Sindh as well as India. This will be briefly discussed in Section IV of this book.

The Pleistocene glaciers made important alterations in the topography of the glaciated regions, leveling hilly sections to low, rolling plains, both by erosion and by deposition of drift, eroding hollows that later became lakes, and forcing rivers to cut new channels by filling their former beds. In the areas adjacent to the glaciated region but itself not covered by ice, such as the foothills of the Siwaliks in northern Pakistan, the Pleistocene was marked by erosion as well as filling in the low-lying areas with debris that the melting glaciers brought with them. The Pleistocene was accompanied by periodic, sometimes severe, tectonic activities in the northern areas of Punjab and northwestern portion of Baluchistan, elevating the existing mountain peaks and generating new highlands. The Himalayas and the Pir Panjal approached their present altitudes during the Pleistocene. Small lakes formed in various parts of the Himalayas, although many of these are dry today as a consequence of erosive action of glaciers and damming of waters by moraines.

Tropical and subtropical areas of lower latitudes also underwent environmental changes during the Pleistocene. Deserts and forests changed their boundaries and alternate dry and wet conditions seemed to have prevailed in the South. These changes are indicated by the presence of fossil dunes in the Cholistan and the Thar Deserts as well as in the Las Bela plains in southern Baluchistan. Sea level decreased and increased as the moisture accumulated in the global ice sheet during glaciation and released during the warmer periods. These changes can be observed in the geological marking on Baluchistan's coastline, grees of hydrological activity.

Culture has been directly affected by climate change throughout the geological record. Humans adapted and migrated in response to severe, repeated, sometimes abrupt climate changes. Archaeological findings show that humans adapted to the extreme cold climate of the Arctic during the late Pleistocene about 27,000 years ago. It is possible that by the end of the Pleistocene human groups were bringing about changes in their environment, consciously or unconsciously, by such means as burning off forest and grassland by accident or design; reducing certain species by excessive hunting or overkill, and thus altering the natural balance of wild life and the environment in general; and protecting and increasing the number or range, or both, of other species. But it is more probable that at this stage the effect of humans upon their environment was marginal, only effective in particularly sensitive areas. In general, man was still largely at the mercy of his environment. The changes in the environment that took place at the end of the Pleistocene undoubtedly stimulated more resourceful human groups to diversify their methods of winning a livelihood from the resources of new environments.

Pleistocene did not depart smoothly but in a violently oscillating fashion. The gradual transition to warmer climate was punctured by brief but intense returns to cold conditions. One of these hiccups was around 11,000 years ago a relatively noteworthy affair for its severity. This episode is now recognized as the Younger Drays event and is a prime example of dramatic and rapid climate

oscillations: the atmospheric temperatures suddenly dropped as much as 7 degrees centigrade within 20 years. The event ended as suddenly as it had begun with a dramatic increase in temperature of 7 degree centigrade. The Younger Dryas is often linked to the adoption of agriculture in the Levant (21, 22). It is argued that the cold and dry Younger Dryas lowered the carrying capacity of the area and forced the sedentary Natufian population into a more mobile subsistence pattern or forced them to 'invent' cereal cultivation. While there exists relative consensus regarding the role of the Younger Dryas in the changing subsistence patterns during the Natufian, its connection to the beginning of agriculture showing varying deat the end of the period is still being debated (23,24, also see Section III of this volume).

Post-Pleistocene Landscape: As stated earlier, the last glacial reached its maximum *ca.* 18,000-20,000 years ago. This was a time of maximum aridity in tropical and semitropical regions, including Pakistan, when many lakes and rivers dried up. By about 15,000 years ago the rate of sea-level rise began to pick up, the seas became warmer and rainfall and humidity increased. Forests and grasslands spread into previously arid regions, deserts contracted, and rivers flowed more regularly, carrying silt in suspension rather than hauling coarse material when in spate. The ice sheet in the northern hemisphere started to lift, and the glaciers in high mountain ranges started to recede. This is the beginning of the Holocene epoch, which we are presently passing through. It is in this period that man started to control his environment, the level of his technology started to improve rapidly, his social structures started to form, and soon he started to produce his food instead of acquiring it by hunting and gathering.

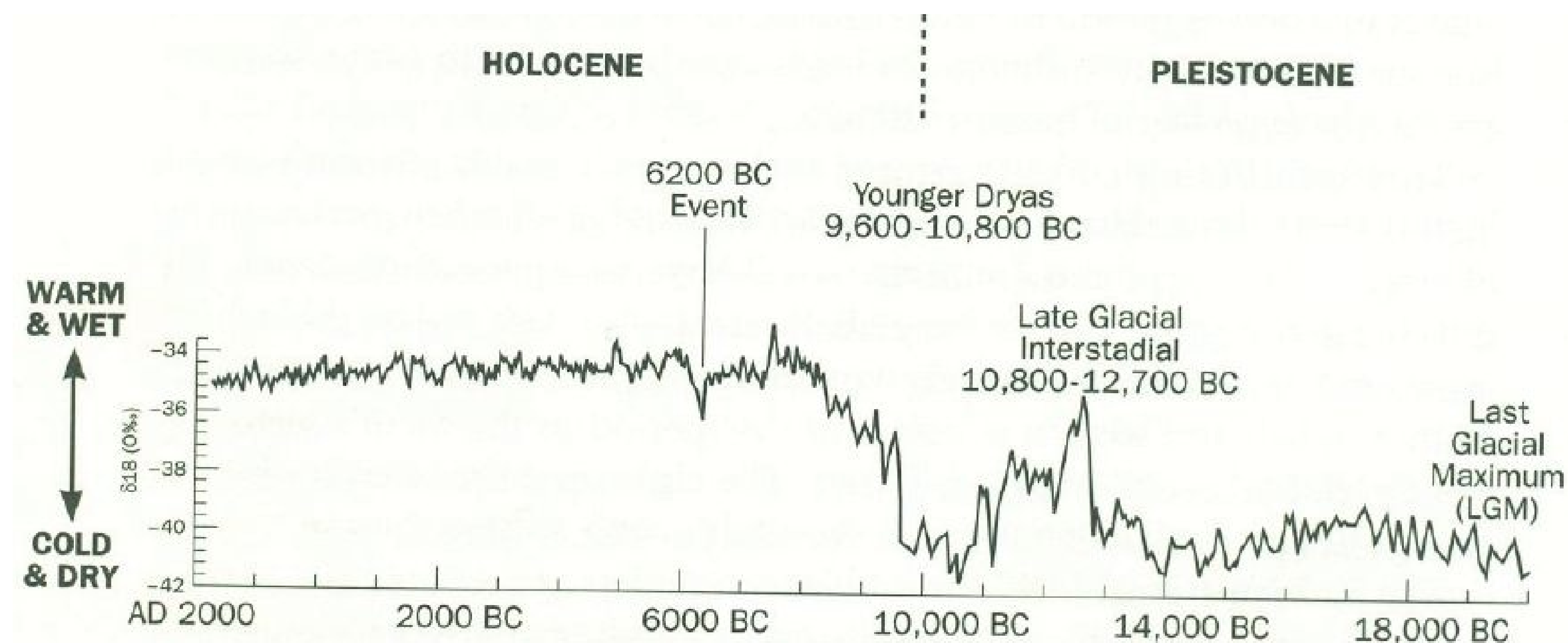
As the ice sheet started to melt and the glaciers began to recede, the land masses gained elevation as a result of being freed from the weight of the ice. Swelled with increased water from the melting glaciers, ocean and sea levels rose, submerging coastal and low-lying areas and reducing the land available for human and animal occupation. For instance, what is now the Persian Gulf was above sea level before the glaciers melted. This would have been a favored environment for humans, animals, plants, and riverine life. Although the ice began to melt around 18,000 years ago and the sea level rose rapidly, the atmospheric conditions did not get much warmer for some time, because the temperature of the sea remained cold due to melting ice.

As these climatic and vegetative changes occurred, large herds of mammals were replaced by more solitary animals, such as red deer and wild goat. In Europe and northern Asia, the cold-adapted animals, such as the reindeer, elk, and bison, retreated to further north, while others, such as the mammoth, giant deer, and woolly rhinoceros, went extinct. As plant and animal species adapted to newly established environmental settings, so did the post-Pleistocene hunting-foraging human communities seize opportunities to pioneer a broader range of habitats and as these nomadic bands followed migrating game animals, they recognized the nutritional and economic potential of different plant species as well. By 10,000 years ago the climate stabilized to more or less what we experience today, of course with some minor periodic variations. This was an important landmark in terms of human development all over the Old World. The improvement and diversity of the environment provided humans the opportunity for cultural and technological experimentation.

Technically, the Stone Age ended with the end of the Pleistocene but culturally it lingered on into the Holocene where it is manifest in the small stone tools, the microliths, strewn all over Pakistan as well as the borderlands of India, Afghanistan, and Iran. On technological grounds, archaeologists have designated this post-Pleistocene or early Holocene period to the *Mesolithic* (middle Stone Age),

which ushered mankind into the Neolithic (the New Stone Age). Although the term *Mesolithic* still maintains its currency, it does not define a specific post-Pleistocene culture general characters of a from which developed incipient agricultural and pastoral practices. Nevertheless, the Mesolithic is important as a transition stage between the Paleolithic and the Neolithic or between the Pleistocene and the Holocene. We therefore devote a full section in in Pakistan beyond the

hunting-foraging lifeway ture as to leave a consistent, recognizable pattern upon the landscape throughout extensive regions of the subcontinent. Dead drainage systems have been recorded throughout much of the Thar desert between the Indus and the Aravalli hills, indicating a widespread increase in humidity. Fossil dunes can be seen along the eastern margins of the desert from the Arabian Sea almost to Delhi - a distance of approximately a thousand miles. The pattern of rivers building up plains and filling valleys, and subsequently incising their channels into these deposits is evident over a large area, including Punjab and Sindh. These changes can be associated with comparable phenomena in other arid regions of the northern and southern hemispheres. They can therefore be attributed primarily to world-wide causes, modified by tectonic events, also part of a world pattern, but of a particular continental charac



A composite picture of temperature change during the late Pleistocene and the early and middler Holocene. Note the extreme changes before the onset of the Holocene.

this book to this stage of human adaptation to the rapidly changes wrought by the onset of the Holocene.

Climatic Changes in South Asia: Important for any understanding of the beginnings of agriculture, pastoralism and sedentary living is a framework of how environments in the past differed and how this affected the distribution of wild progenitors and cultural adaptations. The story of climate change in the late Pleistocene and early Holocene in Baluchistan and Sindh is not particularly well understood and, thus, a detailed review of the paleoenvironmental record for the Greater Indus Region is not possible on current evidence. A few signposts are, however, available and these could serve as a basis for discussions in the following pages.

During the later part of the Pleistocene and the early part of the Holocene the pattern of climatic

change in South Asia was on a scale and of a nater in their effects.

The study of pollen sediments in lakes of Rajasthan, the analysis of fossil dunes in Cholistan, and mapping of the ocean cores from the Indus Delta indicate that there was a marked increase in rainfall in South Asia at the beginning of the Holocene epoch. The change in climate naturally affected both flora and fauna. Large animals gradually vanished and these were replaced with swifter and smaller animals such as various species of deer, cattle, sheep, goat, etc. The fish also became more abundant.

The new environment thus created conditions for the availability of new resources, and in order to exploit them more effectively, it became essential for the Mesolithic man to make necessary modifications in his tool-types. His toolkit now consisted of the composite tools, which could be employed more profitably for hunting and scavenging as well as for collecting vegetal food. Major ecological shifts occurred with the recessions of mountain glaciers, and climatic changes increased habitability of regions formerly too harsh or inaccessible for human settlement.

At the broadest temporal scale patterns of monsoon rainfall in Pakistan and the subcontinent in general can be correlated with those documented in eastern Africa, the Arabian Peninsula and Tibet. It is clear that there have been fluctuations in rainfall levels during the Holocene and this affected shifts in vegetation, but it remains poorly understood how these may or may not relate to the origins and spread of agriculture, pastoralism, and sedentary life.

The evidence from the pollen cores, referred to above, suggests that there has been no significant change in climate or rainfall since around 9,000 years ago, although one study (27) suggests that a more humid climate existed between 3000 and 2000 B.C. Global climatic models (28,29) have suggested that winter rainfall was more abundant in this area between 5800 and 1800 B.C. Between 3000 to 1800 B.C., humidity increased due to an increase in both winter and summer precipitation. After 1800 B.C., the lakes in the Thar Desert and Eastern Sindh dried up, suggesting greater aridity toward the end of the Harappan phase of the Indus Valley Tradition. There are indications that a period of aridification started at the end of the midHolocene but this change seems to be gradual, beginning by the mid-Fourth millennium BC and leveling out at essentially modern conditions before 2000 BC (26). A more sudden increase in aridity at *ca.* 2200 BC has been suggested for some world regions, such as the Near East and must also be considered in the South Asian context, although the Rajasthan pollen sequences make it clear that this could only represent an acceleration of trends already underway in South Asia. All these readings are, however, questionable and some of the interpretations are clearly contradictory. Consequently, these conclusions have, however, been challenged.

D.Q.Fuller (25) has tried to summarize the situation for South Asia by correlating global atmospheric methane with oxygen isotope and sediment data from the Pakistani margin of the Arabian sea and the main pollen zones of adjacent Rajasthan as reflected at Didwana in the Thar Desert (see fig. Below). There appears to be good correlation between the major long-term changes in lake level data, the Arabian sea data and the Greenland ice core. Significant aridification events are indicated in grey. The approximate temporal placement of the origination of various South Asian Neolithic traditions is indicated at the bottom of the chart.

Although there are some points of concurrence, most of the above referred studies on fluctuating rainfalls and the ensuing periods of dry or moist climates are not mutually supported; some of the results are even contradictory. The propositions are generally conjectural and the evidence is largely

indirect or non-existent. Most of these studies have been undertaken with reference to the cultural development in the Indus plain that led to the rise of the Harappan Civilization. The efforts are generally directed to search for the ecological causes for the rise and fall of the Harappan Civilization, looking for a "wet" period during the fourth millennium BC and a "dry" period during the third millennium BC, thus justifying the dramatic growth of agricultural settlements during the Early Harappan period and the demise of the urban centers during the second millennium BC. Such a scenario, in spite of the various attempts, has not been proven beyond speculation. This situation has impelled Sinha to note that the entire subject has been an odd, and unfortunate mix of armchair speculation with just enough field research as to keep the debate alive (30).

Beginning of Agriculture and Urbanization Coincident Monsoons: have been throughout the known records. Climate has had distinct impacts on human society and its evolutionary dynamics. For instance, it has been suggested that increased aridity in Africa led to the eventual rise of arid-adapted hominins and their migration to regions with more conducive climate regimes. Human response to climate primarily arises due to changes in regional hydrology, i.e. an assured availability of water. Water availability appears to be the main reason for all the major ancient human civilizations to grow and flourish along major perennial river systems. For instance, civilizations in Egypt, Mesopotamia, and Pakistan all developed along perennially flowing Nile, Tigris-Euphrates and Indus river systems, respectively. Recent paleoclimatic, archaeological and historical evidences across regions suggest considerable human adaptations, dispersal, population dislocation, cyclic spatial and demographic reorganization such as abandonment and expansion, and human migrations. For instance, there is evidence for climate-induced human migrations in western and central Europe, Germany, North American West Coast, Alaska and Central Andes (94).

The Holocene was once thought as a climatically stable time interval, but well-dated, detailed paleorecords now indicate that the Holocene climate was marked by century to millennial-scale variability both at high and low latitudes. Cultural responses to these changes in climate are manifested in geoarchaeological records, ranging from adaptation to small changes to migration in cases where the changes were extreme. deMenocal (95) presented four examples of population responses to the late Holocene climate change: the collapse of the Akkadian (~4200 years ago), Classic Maya (~1200 years ago), Mochica (~1500 years ago), and Tiwanaku (~1000 cal years ago). Liviu Giosan (93) has related the emergence and fall of the Indus Civilization to increasing desiccation of the Indus Valley and hence decreasing intensity of floods. In all these cases, there was a close interaction be

with Changes in the Intensity of Human
closely
occupations and migrations linked to climate changes tween human cultural elements and persistent multi-century shifts in climate.

Monsoon has been an integral part of cultural, economic and political dimensions of the region. High resolution century-to-millennial-scale records of monsoon change during the Holocene are rare, which may help understand cultural responses to abrupt climate changes in South Asia. To augment this, an Indo-US joint project was initiated, which culminated in the production of a new record of centennial-scale southwest (SW) or summer monsoon variability during the Holocene from rapidly accumulating sediments in the northwestern Arabian Sea. These results combined with land records from southern Oman and eastern Tibetan Plateau have been used to examine links between changes in

monsoon precipitation and population in the Indian subcontinent during the Holocene.

These proxy records indicate that the early Holocene (~ 10,000–7000 years ago) was an interval of warmer and wetter conditions with intensified SW monsoon (94). Several major rivers, including the Indus were flowing with full vigor during this time. Documentation of the early Holocene SW monsoon intensification and changes in rainfall and major fluvial-sedimentary systems begs the question: were the rise and fall of the Harappan Civilization and beginning of agriculture in the Greater Indus Valley climatically mediated? Palynological and archaeological evidences suggest such a link between rainfall and the rise and fall of the Indus Age does exist.

The early settlement at Mehrgarh is dated ~9000 years ago, which presents the oldest evidence so far for the beginning of agriculture and domestication of animals in the Indus system, coinciding with the peak intensification of the SW monsoon (98,99). Mehrgarh provides an important evidence for the change from hunting, gathering and pastoralism to a subsistence economy centered around settled agriculture and domestication of wild animals. Agriculture might have allowed people to become sedentary, establish permanent villages and towns, and develop stratified societies. Evidence from Mehrgarh suggests that the cultivation of wheat along with barley has been from the very beginning of agriculture (100). The plant remains belong to a variety of fruits, including jujube, stones of date palm and grape seeds. In the subsequent period (~ 7000–6000 cal years ago), archaeological evidence suggests that the production of grains, particularly wheat, and the construction of mudbrick storehouses increased steadily in Mehrgarh area. The spread of agriculture thus was essentially the expansion of the highly successful pattern of wheat and barley production, and domestication of cattle, sheep and goat that emerged at Mehrgarh area.

The increase in rainfall throughout the Indus basin must have created conditions conducive for an expansion of agriculture to the other areas as well. Thus the early Holocene interval (10,000–7000

A

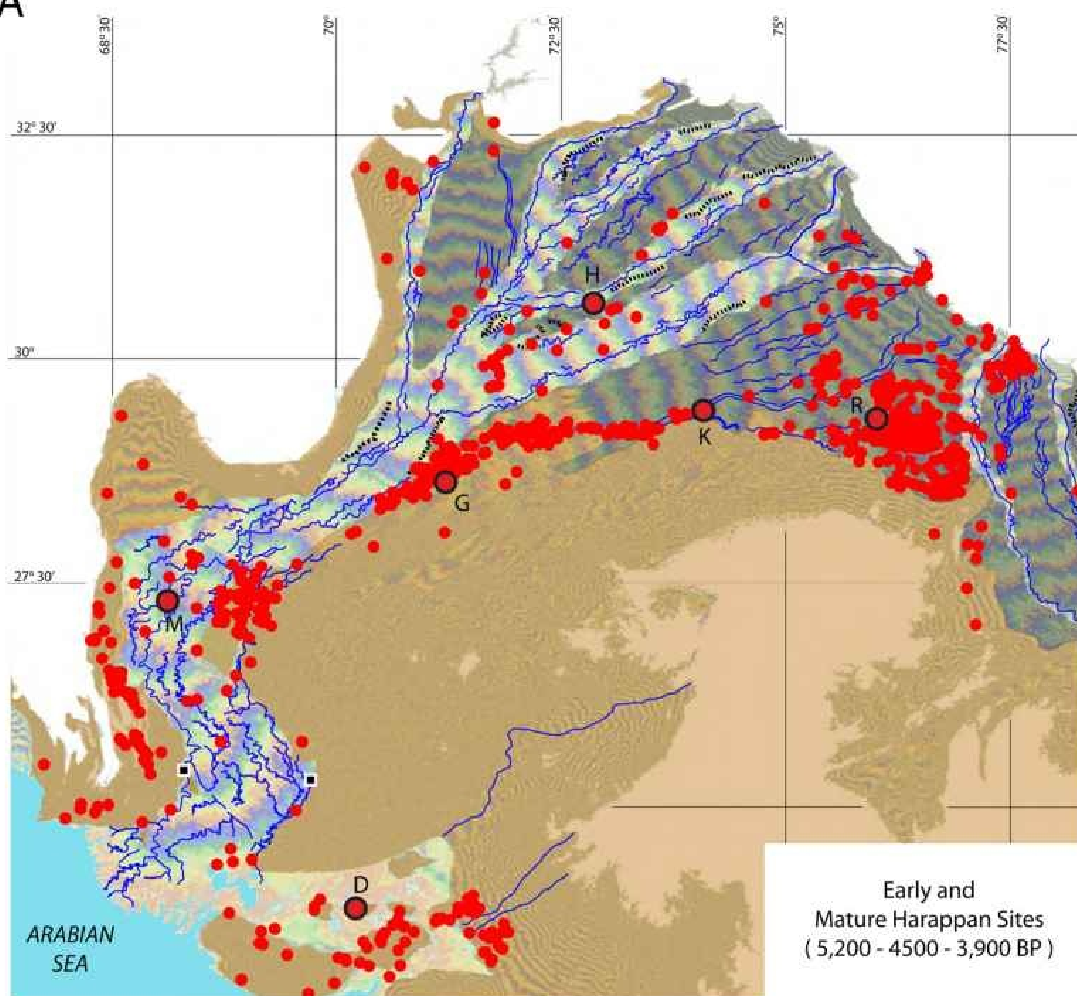
Fig. 2. (*A*) Morphology of the western Indo-Gangetic plain with interfluves (in gray mask), incised valleys (no mask), terrace edges (as dashed black lines), and active and fossilized river channels (in blue). Legend further indicates sampling locations and types. (*B*)Pre-Harappan sites with modern region names, chronological information (youngest fluvial deposits at all sites), and selected town names.

during the last glacial period, but switched to the Ganges basin before Harappan times.

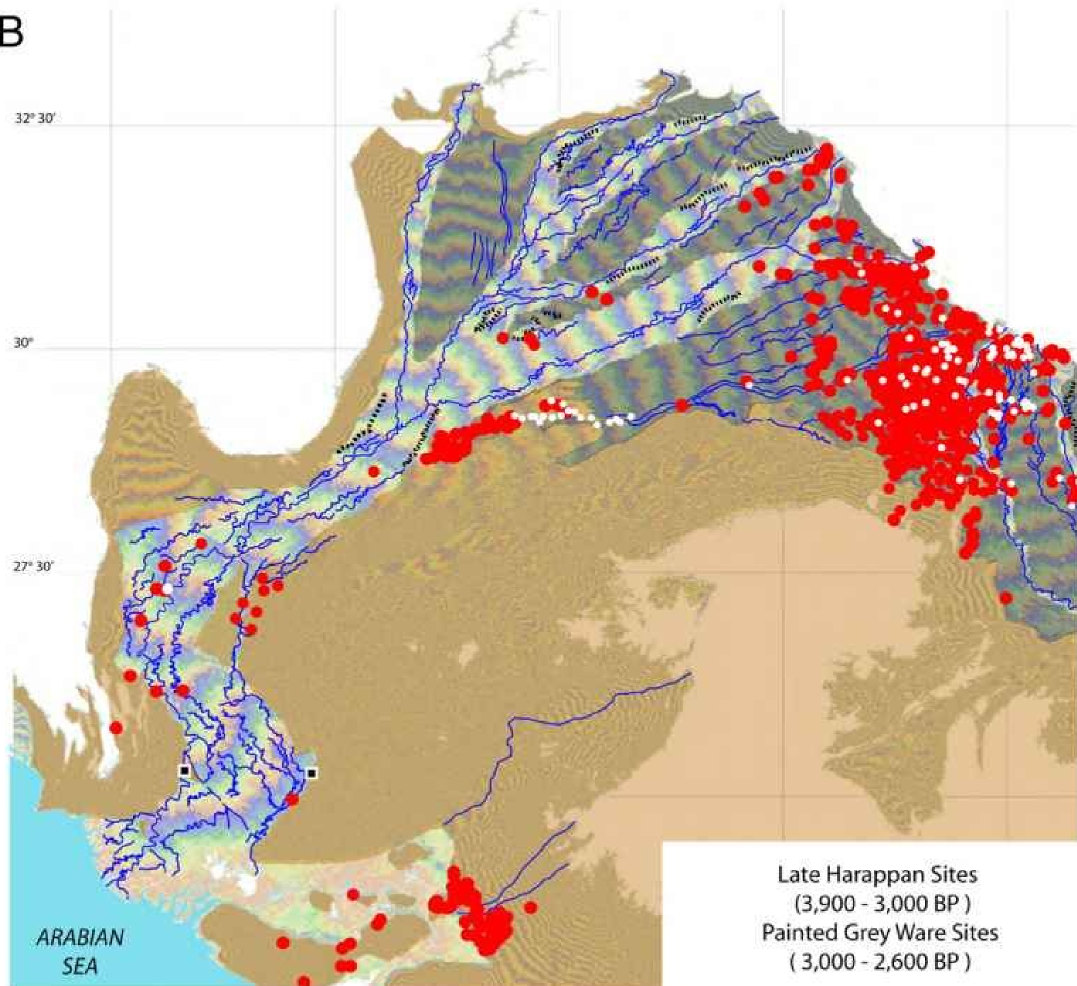
The present Ghaggar-Hakra valley and its tributary rivers are currently dry or have seasonal flows. Yet rivers were undoubtedly active in this region during the Urban Harappan Phase. We recovered sandy fluvial deposits approximately 5400 y old at Fort Abbas in Pakistan (*SI Text*), and recent work (33) on the upper Ghaggar-Hakra interfluve in India also documented Holocene channel sands that are approximately 4;300 y old. On the upper interfluve, fine-grained floodplain deposition continued until the end of the Late Harappan Phase, as recent as 2,900 y ago (33) (Fig. 2*B*). This widespread fluvial redistribution of sediment suggests that reliable monsoon rains were able to sustain perennial rivers earlier during the Holocene and explains why Harappan settlements flourished along the entire GhaggarHakra system without access to a glacier-fed river (5, Fig. 3 Similar, strictly monsoonal rivers maintaining a groundwaterfed base flow are now active only on the more humid Ganga basin (34). We also document renewed fluvial deposition on the lower Ghaggar-Hakra system approximately 700 y ago, which indicates

B

A


68° 30'
70°
72° 30'
75°
77° 30'
32° 30'
30°
27° 30'
H
K
R
G
M
D
ARABIAN SEA
Early and Mature Harappan Sites (5,200 - 4500 - 3,900 BP)

B


32° 30'
30°
27° 30'
ARABIAN SEA
Late Harappan Sites (3,900 - 3,000 BP)
Painted Grey Ware Sites (3,000 - 2,600 BP)

C

Settlement pattern in the Greater Indus Valley

(A) Pre-Urban sites (fourth millennium BC);

that seasonal monsoon flows intensified episodically during the

(B) Harappan Civilization (2500-2000 BC);

Fig. the western Indo-Gangetic plain (see Fig. 2 for color conventions Harappan sites, with names of some major urban centers: Ganweriwala; Rakhigarhi. (

Ware (white) sites.

1,500 y old on the edge of the expanding Thar Desert have begun

to cover this region of the interfluve, but sediment originating

that seasonal monsoon flows intensified episodically during thelate Holocene and may provide an explanation for the high con1,500 y old on the edge of the expanding Thar Desert have begun

(C) Post-Harappan Period (1500-500 BC).

late Holocene and may provide an explanation for the high conto cover this region of the interfluve, but sediment originating

centration of medieval fortified sites in this region (5). from the Indus-Punjab system, the Ghaggar-Hakra, or from

centration of medieval fortified sites in this region (5).Farther to the south, the five Punjab tributaries of the Indusfrom the Indus-Punjab system, the Ghaggar-Hakra, or from

both of these river systems was deposited as late as 4,250 y ago Farther to the south, the five Punjab tributaries of the Indus both of these river systems was deposited as late as 4,250 y ago

(Fig. 2*B*; *SI Text*

merge to form the Panjnad River, before joining the Indus (Figs. 1 merge to form the Panjnad River, before joining the Indus (Figs. 1 (Fig. 2and 2*A*). Incision (4–5 m deep) between the two confluences and

and 2*A*). Incision (4– 5 m deep) between the two confluences and

B; *SI Text*). Zircon dating of sand in this confluence region

indicates inputs from both Beas and Sutlej drainage basins (32).

indicates inputs from both Beas and Sutlej drainage basins (32).further south along the greater Indus separates vertically the**Continuing to the southwest on the Ghaggar-Hakra interfluve, we**

further south along the greater Indus separates vertically the

modern floodplain and the southernmost extension of the Ghagdocument well-watered lands in the region of Pat, where channels

modern floodplain and the southernmost extension of the Ghag

gar-Hakra interfluve in the Cholistan region. Dunes younger than

gar-Hakra interfluve in the Cholistan region. Dunes younger than

document well-watered lands in the region of Pat, where channels **ran parallel with the Indus and joined the Nara valley; their fluvial**

cal years ago) was marked by a subsistence economy based on the cultivation of wheat and barley and urban civilization. The evidence that ca. 10,000 to 7000 years ago there was a general increase in rainfall in South Asia adds credence to the hypothesis that proliferation of early civilizations and beginning of agriculture in Pakistan were closely linked to the strength of the winter monsoons. It is likely that the rainy season was longer in the early Holocene that provided with enough moisture for growing of wheat and barley. Excess rain and/or longer summer monsoon season in the early Holocene might have caused widespread floods and that probably did not allow early farmers of the Indus region to settle on the banks of rivers. It became possible only when the intensity of rains was sufficiently decreased and the settlement of plains along the rivers became feasible. It was during this time, that is after 7,000 years ago, that a real expansion of agriculture in the Indus Valley took place. In summary, the strong monsoon of the early Holocene appears to have been wet enough for dry agriculture during the winter season, while the late Holocene (7000 cal years ago) was drier, and coincided with the appearance of irrigated cultivation. This irrigation was, of course, natural, in the form of annual inundations.

Recently, a multi-disciplinary research team, lead by Liviu Giosan (93) has examined the issue of the appearance of a large number of agricultural villages on the Indus plain during the fourth and fifth millennium BC and the demise of the Harappan Civilization in the second millennium BC. They have come to the conclusion that the spread of agricultural villages in the lower Indus plains, especially the growth of the Early Harappan settlements, did not happen in a particularly “wet” period. Instead, it was the *decrease* in volume in the Indus and its tributaries that caused this growth. The hypothesis is that in the early Holocene the water level in the rivers was so high and the inundations were so intense and frequent that settlement around rivers was not possible. By the Middle Holocene, that is, by the fifth millennium BC the monsoons had shifted towards the east, the rivers lost their ferocity and settlements along their banks became possible. However, as the river inundations decreased much further with continued shift of the monsoons eastward, agriculture became difficult for want of the needed moisture, the ‘surplus’ became minuscule and consequently the urban centers declined. The comparative settlement densities, as depicted in the figures below illustrates this point.

This is a commonsensical approach and is based on an extensive multidisciplinary study of fluvial (between rivers) landscape. It is especially relevant to the ebb and flow of settlement pattern in the Indus Valley from the fifth millennium BC onward. The research was conducted between 2003 and 2008, from the coast of the Arabian Sea to the fertile irrigated valleys of Punjab and the northern Thar Desert. The international team included scientists from the U.S., U.K., Pakistan, India, and Romania with specialties in geology, geomorphology, archaeology, and mathematics. By combining satellite photos and topographic data collected by the Shuttle Radar Topography Mission (SRTM), the researchers prepared and analyzed digital maps of landforms constructed by the Indus and its tributaries over the millennia past, which were then probed in the field by drilling, coring, and even manuallydug trenches. Collected samples were used to determine the sediments' origins, whether brought in and shaped by rivers or wind, and their age, in order to develop a chronology of landscape changes wrought by the Indus and its tributaries. From this research, a compelling picture of 10,000 years of changing landscapes emerges.

The analysis of Giosan team reveals a palimpsest of fluvial forms and deposits in the Indus plains; however, one constant trait that is evident across the entire Indus landscape is the change from a more energetic fluvial regime earlier in the Holocene (before approximately 5,000 years ago) to increased stability of alluvial forms by Early Harappan times, and even drying up of some river channels during and after Harappan times.

Summary: At the present time the accumulated data is insufficient to drawn any conclusion about the post-Pleistocene climate and their effect on flora on fauna in the Greater Indus Valley. The contradictory opinions among the concerned scientists are obvious. The question, we may remind ourselves, is not a paleoclimatic issue *per se* but one of determining, first, the extent to which any postulated climatic change affected the density, spread, and types of vegetation of the region along with a change in its agricultural potential, and second, the degree of the impact of such changes on the associated human social, cultural, technological, and economic landscapes. The density and spread of vegetation and human settlement were no doubt connected with the moisture available for food production. In context with the Greater Indus Valley, this needed moisture could be provided by the rainfall or by the annual inundations of the rivers. The real question is, how these sources of water changed with time and how the Indus people reacted to this change.

It is generally agreed that in the beginning of the Holocene the atmosphere was relatively moister, the temperature was rising and the rainfalls were plenty. This climate created the environmental conditions under which the domestication of plants and animals became possible and agriculture took hold. Soon thereafter, however, probably by the fifth millennium BC, the intensity of rainfalls started to decrease and continued to decrease till it reached the level of the present day. How this gradual and long term change in rainfall regimes affected the Indus culture around Mehrgarh and how did it affect the expansion of agriculture in the Indus plains is the real question. Gaussian et al have tried to offer an explanation and that makes a lot of sense. Compared to the proponents of a steady decrease in rainfall from the onset of the Holocene, there are some researchers who have mapped several 'wet' and 'dry' periods and tried to correlate them with the rise and fall of settlement density in the plains of the Indus. The rapid expansion of agricultural villages in Sindh and Punjab in the fourth millennium BC has even associated with the 'wet' period, while the decay and demise of the Indus Civilization in the second millennium BC has been shown to be a result of the 'dry' period. These results, although offered with much conviction, are , however, confusing and often contradictory, depending on the evidence employed and the methodology used.

Then, there are a number of other researchers whose research shows that the climate of the Greater Indus Region has experience no perceptible change from the onset of the Holocene till the end of the Indus Age. For example, Tengberg and Thiebault (31) examined thousands of charcoal fragments obtained from a number of Neolithic sites in Baluchistan and came to the conclusion that the nature of the vegetation cover in the entire Baluchistan was the same throughout the time period from the beginning of the Holocene some 12,000 years ago up to the rise of Harappan Civilization some five thousand years ago, thus indicating no major change in climate during this time period. It has also to be remembered in the same context that the ancient sites are almost invariably found in those areas which still support human settlements. This is an endemic feature and we shall emphasize this aspect as we go along. From the archaeological point of view, the most obvious aspect of the site distribution of early and middle Holocene is the fact that both ancient and modern sites occur together.

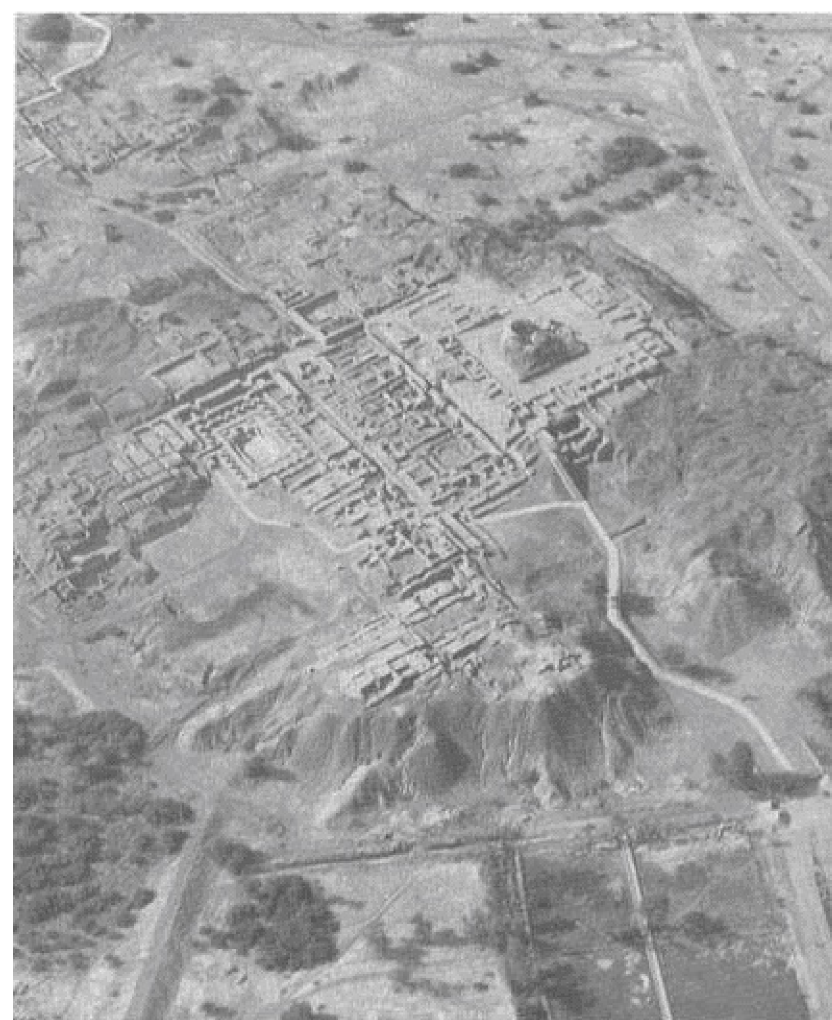
Thus, for the moment one can imagine these times to have been not much different from today with respect to rainfall (9). This does not mean that minor and short-range climatic changes did not occur. In fact, there is evidence of fairly widespread climatic fluctuations of a minor kind during the Holocene from many parts of the world, and there can be little doubt that, like the more marked variations of the Pleistocene, some of these were part of world-wide patterns. In some cases, regional factors have proved stronger and dominated the world-wide pattern. In others there is evidence of quite marked regional or local change apparently unrelated to wider patterns.

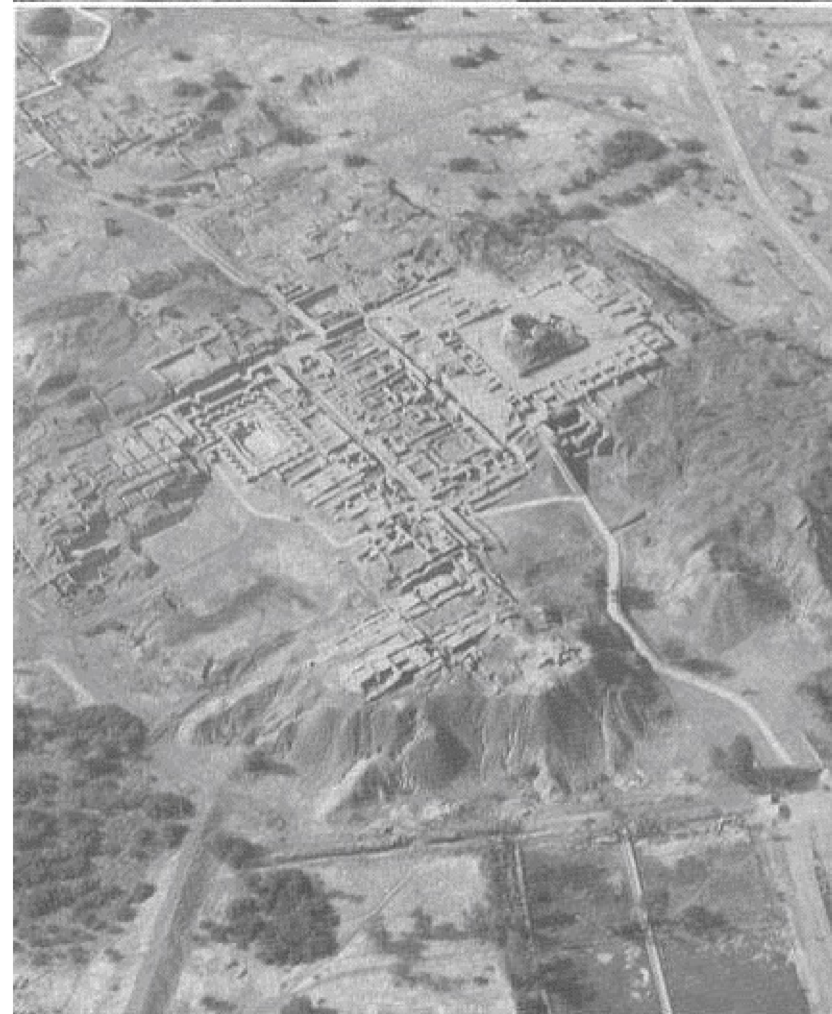
Various environmental fluctuations of the late Pleistocene and early Holocene have at one stage or another been drawn into explanations of agricultural origins and expansion. These have included changes in aridity (32), sea level (33) and temperature (34). Such explanations have tended to emphasize particular events, rather than the overall variability of the Quaternary episode of which they are all part.

Since we do not have sufficient data available to us and since the interpretation of the available data is so controversial, we shall not go any further into this discussion; it is sufficient for the present to be aware that such changes do take place, and have taken place in Pakistan as they have in other parts of the world. We may come back from time to time to this topic during the course of our discussion on the origins and spread of agriculture in Baluchistan and Sindh because changes in environment have had profound effects upon the life and culture everywhere in the world and these, in turn, have affected the course of history all over the globe

I.4. Prehistory, Archaeology, Anthropology, Ethnology, etc.

Introduction!





An aerial view of the ruins of Mohenjo-daro

By its very definition, prehistory does not

accuracy of a history of Rome or Greece. But what is history? If history means
derive from any written account. We learn about it
only the succession of outstanding megalomaniac names and imposing battles,
through the remains of those who lived in that re
the history of ancient Pakistan would be difficult to write. If, however, history is

mote past. It is a product of archaeological endeavors, aided by geology, physics, chemistry, biology, and other physical sciences. However, the archaeological remains do not speak by themselves to tell a story. They are only a few signposts, in fact a few footprints on the sands of time. Social sciences, such as anthropology, economics, religion, and sociology, come to our help to analyze these findings and to put them in perspective so that a coherent story of human endeavors can be told. In the end, however, archaeologists are the real authors of prehistory. This applies to Pakistan as well as to any other region of the Old World. These archaeologists, mainly Europeans but also some Americans, are many. They have tirelessly worked in the barren hills of Baluchistan, sandy desert of Cholistan, inhospitable plains of Sindh, treacherous passes of the Pashtun country, obscure valleys of Pothwar, the dry riverbeds of Punjab, and the salty marshes of Kutch. We are indebted to them all for opening to us the secrets of prehistoric Pakistan and tracing the cultural and technological development of its ancient inhabitants. We are also indebted to several indigenous archaeologists, mainly from the Archaeological Department of Pakistan and the Peshawar University, who after 1950 pitched in these efforts with renewed vigor and a sense of professional pride. The beginning has, however, been done by the Archaeological Survey of India in the British times, and some of these efforts were not only pioneering but extremely productive.

The study of the development of material culture has been a major objective of prehistory and in this archaeologists have most readily extended their helping hand to prehistorians. The focus has, however, recently shifted to include the relationship of cultures to their surroundings and examine the questions of how and why. Food gathering, hunting, fishing, and agriculture, as well as long distance communications and their development through time - all began to be considered as being within the scope of archaeology. The disciplines of anthropology and ethnobiology have started to elucidate certain aspects of human condition in the remote past that could not have been dealt by archaeology alone. Population genetics is another branch of science that is increasingly playing a dominant role in defining human dispersal and interaction between population groups and thus helping the archaeologist and anthropologist in getting a new perspective on human history. Geology has proven to be important in tracing the spread of humans though the continents in the Stone Age but its role in tracing the cultural developments of recent times has been limited.

Historical interpretation derived from regional data and evaluated through a global perspective should be the goal of the student of prehistory. Thus, as we study the happenings within ancient Pakistan, we are on the lookout to see what was happening around our main area of interest. This brings us face to face with absolute chronology. It tells us what happened when. An absolute chronology is often our aim but a comparative chronology would do when we do not have any better point of reference available to us. This may be an incomplete story, sometimes a speculative enterprise only, but it is interesting nevertheless.

Prehistory: Prehistory is a branch of history that deals with the events and processes in human development, its social structure, and its cultural milieu, for the time periods where written records are not available. In the absence of any written records, prehistory almost wholly depends on archaeological findings and their anthropological interpretations. Thus, archaeology and prehistory

are inseparable and sometimes it becomes difficult to distinguish where archaeology ends and prehistory begins. Prehistorians are, however, not a distinct breed altogether. Some prominent archaeologists are capable of telling the story of human development in plain words although they would use their special language when they discuss their findings with other members of their own species. In context with the prehistory of Pakistan, we are lucky to have quite a few of them. Unfortunately, almost all of them have treated the prehistory of Pakistan as a part of the prehistory of "India" and we must do the exercise of separating the grain from the sheaf**.**

The study of prehistory is ultimately concerned with the genesis of civilization: how man's remote past led to the origin of that way of life whose complexity man has struggled to encompass ever since. The evidence consists largely of the artifacts of daily life, especially the tools and weapons that relate to the finding and preparation of food. Consequently many attempts at reconstructing prehistoric life are dominated by scenes of naked or semi-naked individuals crouched over a fresh kill or squatting by a campfire gnawing at the food. Such scenes, however, deny the prehistoric man the cultural sophistication, which must necessarily have existed if civilization was to emerge from an essentially barbaric way of life. The beginning of agriculture and domestication of animals, the start of permanent settlements, the emergence of farming villages, the long distance communication and incipient trade between these settled communities, and their transformation into town and cities, speaks itself for the presence of culture in human communities and its development with time

"We find certain types of remains - pots, implements, ornaments burial rites, and home forms - constantly recurring together. Such a complex of associated traits we shall call a 'cultural group' or just a 'culture' We assume that such a complex is the material expression of what today we would call 'a people'."

(Gordon Childe, 1929, in the Preface of The Denube in Prehistory)

The studies of prehistoric man necessarily emphasize his material side, for that side is most evident in the surviving bone and stone, which represent him. It is relatively easy to demonstrate a prehistoric development of technology and to argue for stages of material development or for markedly different cultures, from the wandering days of primitive scavengers to the sedentary stabilities of the food-producing farmers. It should be evident, however, that economically determined stages of prehistoric life might also have marked stages in the growth of human awareness, of the development of thought, and the recognition of his place in the known cosmos. This intangible prehistory, the preamble to civilization, is, however, difficult to prove by evidence. Imagination and conjectures must be applied and comparison with known and living primitive societies in some other parts of the world must be exercised

".....Human beings are not the only actors who make history. Other creatures do too, as do large natural processes, and any history that ignores their effects is likely to be woefully incomplete."

(Cronon,W., 1933, The Use of Environmental History)

The study of prehistory is an interdisciplinary endeavor. Given the information explosion and ever-increasing specialization, however, the mastery of even a small sub-disciplines is well nigh impossible today. Consequently, one of the more intractable problems in interdisciplinary research is trans-disciplinary communication. It becomes increasingly difficult to stay abreast of developments outside one's own field and, almost unavoidably, complexities are neglected while theory remains out

of date. Moreover, minority perspectives are often unwittingly mistaken for the majority viewpoint because only a few individuals, with little critical review, serve as explicators of the discipline's body of knowledge.

The prehistory of West Asia in general ends with the appearance of the art of writing in terms of the actual years before the Christian era. In Pakistan, though writing was presumably known and employed in the third millennium BC, the peculiar script is still undeciphered. The civilization, which produced it, is, therefore, as prehistoric as the time before it. After the appearance of some written but unreadable records, there is a complete gap in any known written documents on stone or clay or metal until we come to the inscription of Ashoka set up about the middle of the third century BC in northwestern areas of Pakistan and Eastern Afghanistan. During this period, and the period before, there was no writing in any region adjacent to Pakistan either. So prehistoric Pakistan may in its widest sense embrace all human communities, from the Stone Age to somewhere near the Christian era, or in many regions beyond this limit. Till this time period, the discovery and interpretation of Pakistan's history must therefore rely on the same methods as have been used in Europe and elsewhere to study human development before the advent of writing.

While the history of each continent was unique, and has required its own specific mix of narrative and causal argument to explain, some forces of historical change were common to all. Global warming was one. Human population growth was another; this occurred throughout the world as people were freed from high mortality imposed by ice age droughts and cold. A third common factor was species identity. All people in all continents at the close of the Pleistocene, *ca*. 15,000 years ago, were members of Homo sapiens sapiens, a single specie of mankind. As such, they all shared the same biological drives; all possessed a peculiar type of mind, one with an insatiable curiosity and a new-found creativity. This mind - one quite different from that of any human ancestor - enabled people to spread all over the earth, to invent, to solve problems, and create new religious beliefs and styles of art.

In this volume we are primarily concerned with the time period from the end of the last ice age to the development of village farming communities or from the end of nomadic foraging to food production and living in fixed settlements. Although the history of most of the geographic regions in the Old World was conditioned by the type of wild resources it possessed and the specific characteristics of its environmental change, neither of these determined the historical events that occurred. People always had the choices and made decision from day to day, albeit with little thought or knowledge of what consequences might follow. No one planting wild seed in the vicinity of Jerico in the Near East or taking a wild goat as a pet in Mehrgarh in Pakistan anticipated the type of world that farming and herding would create. In fact, human history arose from accident as much as by design, and the paths of historical change were many and varied. In western Asia, hunter-gathers settled down to live in permanent villages before they began to farm, just as they did in Japan and India. Conversely, plant cultivation in Mexico and New Guinea led to permanent settlement. In northern Africa and to a large extent Baluchistan, cattle came before crops. In Japan and the Sahara the invention of pottery preceded the start of farming, whereas it occurred simultaneously with the origins of rice farming in China; its invention in western Asia came about long after farming had begun to flourish.

Gordon Childe, whose ground-breaking work was first published in the 1920s and 1930s, proposed an analogy between the writing of history and the writing of prehistory. Childe's solution was to think

of prehistory as a drama, but to populate the stage not with individual actors or familiar institutions, but with archaeological 'cultures'. The material culture of each *cultural* group represented not an ethnic, linguistic or racial group, but simply those people who shared that common *culture*. Using the model of an archaeological culture, Childe wrote powerful historical narratives throughout his career,

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Archaeologists dimly perceive the processes of cultural change in
their collections of artifacts gathered from the earth by one means
or another. Anthropologists, especially paleoanthropologists and
archaeoanthroplogists, those who are mainly concerned with the
studies of ancient humans, look at these collections, evaluate the
observations and try to evolve a mental picture as to how the ancient
man lived and functioned in that far away time. Prehistorians take
this collective evidence, try to connect it with other evidence
through a thread of time, and attempt to create a plausible story.
Some of them are prone to grasp too readily at mirages cast up by old
sherds of pottery and the paintings thereon, ruined walls and houses,
or the stone tools that the primitive man left behind for posterity.
Often, they are led into wilderness of speculation. Others, too
skeptical to see substance among the shadows, simply count and
recount the archaeological findings and are content. Still others
strive with every means at hand to comprehend what clues the
archaeologists have in order to resurrect the outlines of a teeming,
long dead world but somehow create shapelessness only. All this
exposes a sense of complexity and bewilderment perhaps not found in
any other discipline. The difficulties in interpretation are immense,
and oftentimes the exercise seems to resemble the efforts of solving
an unsolvable puzzle.
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(paraphrased from Walter A.Fairservis, Jr, *The Roots of Ancient India***)**

covering both Europe and southwest Asia, and continued until his death to produce revised editions of his most influential books. Several authors have, particularly Renfrew (35), Shennan (36) and Hodder (37), have criticized Childe's model of prehistory by pointing out the theoretical flaws and the practical failures of Childe's culture-history model, and Watkins (38) has recently offered even a stronger critique of Gordon Chile's theoretical However, prehistoric archaeologists southwest Asia or elsewhere have not yet developed a replacement model for making of prehistoric narratives. The prehistory of south Asia is, therefore, often analyzed in this light.

Pakistan's history and prehistory has been routinely treated as an appendix to that of "India" and ancient Pakistan has not yet been recognized as a specific and highly differentiated geographic as well as cultural area that deserves to be studied in its own right. Over the last two centuries or more, scholars have certainly mapped the variously differentiated regions of ancient history of "India", and tried to recognized the special character of the Greater Indus Region, but in almost all cases this has been no more than a preliminary sketch of the terrain and the description of some prehistoric events without any efforts to integrate these finings with the overall narrative. It is doubtful if they could do

any better because the archaeological evidence collected from this region almost never fits in the overall picture of northern, central, and southern India with which most of these scholars have been concerned. It is under these circumstances that a few pioneering modern historians tried to sketch the outlines of Pakistan's prehistory, moving from epoch to epoch, cultural stage to cultural stage, phase to phase, and period to period and giving us a general scaffolding which somehow holds together to construct an edifice Th.at seems to be a reasonably whole. It is satisfying that such a beginning has been done, not only by Wheeler, Possehl, Wright, and others in the West but also by a few "Marxist" historians in India itself.

The past is a hotly contested areas of modern times. It is true for Pakistan as well. The period covered in this series of books is especially prone to these ideological and petty national interest. The fact that it has become so is, in a large measure, due to a sense of monolithic Eurocentric past that we have inherited as a colonial legacy in a large part of the world. One grows up with a self evident history of the cultural lead of the West in civilizing the East. This overriding western influence and subsequent assimilation of the various incoming western cultures with the pre-existing indigenous strands are believed to constitute the very basis of ancient society and history of South Asia, including Pakistan.

The evidence for this civilizing role of the West starts right from the early Stone Age, first denying the evidence of a deep antiquity of early framework. working in hominids in Pothwar, northern Punjab, then imposing the same sequence of technological progress as that found in the Near East and Europe, and finally importing the anatomical 'modern man' to the Lower Sindh from the Levant and Europe via the 'southern coastal route' and to the northern regions via the 'central Asian pathway'; this modern man then eliminating and replacing the all existing 'archaic' humans of the land. The technological prowess and the abstract thinking of these newcomers ultimately paved the way to the dawn of the new age.

This is just a beginning. According to the received wisdom, it was in the West Asia that humans domesticated plants and animals and learnt to live permanently in fixed locations. It was this Natufian culture, that not only changed European foragers into farmers but also taught the art of sedentary living and food production to the inhabitants of the whole of Asia, making the parallel developments in Baluchistan merely a shadow of the Fertile Crescent. Naturally, when these seed-bearing Near Eastern farmers came to Baluchistan, they brought their languages with them, of which Punjabi, Urdu, Pashto, Sindhi, and all are the descendent languages of the West. In another scenario, it was not the Indo-Aryan language that came with the farmers of the west, but the root language of the Dravidians. This language, of course, later got replaced in Pakistan and northern India by the Indo-Iranian languages which were the gift of a robust group of people emanating, again, from the West.

This line of thought is being variably followed by most of the prehistorians of South Asia but is strongly resented by some. Sometimes the reaction, mostly from the 'nationalist' scholars of India, such as D.K.Chakrabarti, is rather too strong and clearly accusatory of being based on 'racism' (39). The prehistorians and archaeologists of Pakistan, on the other hand, take this reconstruction of their country's ancient past in stride as they, by and large, would rather associate with the West rather than with the East. As will be seen in the body of this book, the role of the West in shaping the Neolithic culture of Pakistan cannot be denied but making this interaction with the West the sole or even a dominant base of indigenous cultures would be a folly.

Another bone of contention in this stew is the question of "India" as one single geographical and

cultural entity, of which Pakistan is supposed to be a part. Pakistani scholars vehemently resent this line of thought and in their reaction they would even deny the status of the present day India as one cultural entity in itself. This resentment most likely comes from a failure of some of the Indian archaeologists to see the past from regional points of view rather than from a single subcontinental vintage point. In the opinion of some, including this author, this attempt of seeing the prehistory of South Asia from the point of view of a single region often confuses the issues and illuminates none. This practice of inserting a square peg into a round hole is so pervasive that the Indian prehistory got as much distorted in the process as that of Pakistan. This ‘all-India’ approach is, in fact, a legacy of the colonial scholarship to which most of the western scholars still subscribe. Terms like “Indo-Gangetic plains” are common in archaeological literature. To these western scholars, British “India” is still a reality and for them the roots of this reality must go back deep into the ancient past.

A third factor that is distorting the prehistory of India as well as that of Pakistan is the selective use of archaeological data emanating from Pakistan for showing the antiquity of India (the evidence of early hominids, the origins of agriculture and sedentary life, emergence of an early civilization, for example) but otherwise completely ignoring the whole Indus Valley and Baluchistan as a backdrop of Indian history. Even the core area of the Indus Civilization has been rapidly shifting to the East, square by square, mile by mile, to comfortably nest in the midst of the Ghaggar-Hakra River, now dry (often mentioned by its hypothetical name of *Sarasvati*). This ‘nationalistic‘ approach to the archaeological evidence has been gaining momentum since early seventies, thanks to some expatriate Indian scholars in the United States and the UK and a legion of popular make-belief archaeologists and their students in India. Any mention of the diffusion of ideas and technology or men and beast into India from the Indus Valley is an anathema to these scholars. Reacting to this onslaught on the prehistory of this region, there are those who deny that the Greater Indus Valley was even a marginal beneficiary of the developments, material or otherwise, in India. This is an unfortunate situation, indeed, and one has to be on guard against such gross distortions of prehistory.

As a parting thought, the ancient history of the subcontinent, including that of Pakistan, was discovered by the west and it‘s the western scholars who defined it. When European concepts of human origins, biological diversity, and prehistoric ways of life were imported to South Asia, they were superimposed upon more ancient native traditions, which addressed many of the same questions but from within an entirely distinctive cultural context. In the West, paleoanthropology and other related disciplines developed as a part of a broader intellectual framework of humanism, empirical science, and the Christian tradition. More specifically, questions of human origins, racial differences, and man‘s place in nature were sought in the ideas of progress and a Biblical chronology. Indian scholars, on the other hand, deal with problems of humankind and the natural world from a very different and completely alien perspective. This has created a tug-of-war in historic interpretation between the two groups. The reaction to the western interpretation of history and changing fate of man was, however, mute, even a passive acquiescence with the Muslim scholars of Bangladesh, India, Pakistan, Iran, and Afghanistan as they derived from the same Judeo-Christian ethos which was their own background.

Over and above such differences, there are two other impediments that are keeping the western and Indian scholars apart. First, while European and American investigators of human evolution and prehistory sought to free themselves from religion, Indian scholars turned to religious texts for answers. Second, whatever the western thinker say about India‘s past, it is conceived by Indian scholars as an evidence of ‘colonial thinking‘ of the past. Of course, Indian scholarship is not a

monolithic enterprise: there are those who do not give any weight to the Vedas or the Puranas when they talk about history or the development of man itself. There are also those who are rightfully thankful to the western scholars for bringing the Indian history to light and contributed to the pool of this knowledge without showing any signs of Vedic primacy and the Aryan origins of civilization or trying to prove the remote antiquity of the Indian Civilization or the Indian origin of man.

The study of prehistory of Pakistan today is in a state of crisis. It would be an understatement to state that much of Pakistan's prehistory, or for that matter, that of India, as presented in the existing textbooks, is inadequate: some of it quite simply wrong. A few errors, of course, were to be expected, since the discovery of new material through archaeological excavation inevitably leads to new conclusions. But what has come as a considerable alarm is that prehistory, as we learnt it in school and college textbooks, is based upon several assumptions which can no way be accepted as valid. So fundamental are these to the conventional and wellaccepted view of the past that prehistorians in both India and Pakistan refer to the various attempts that question the traditional views and attempt to reconstruct the past without them, as "Marxist history".

At first sight the problem appears to be one of dating, of establishing a chronology of different sites in prehistoric South Asia. But, the underlying difficulty is much more serious, and springs from our whole approach to the prehistoric past. It turns out that what at first seems a minor inconsistency in the chronology betrays a serious flaw in archaeological theory in general, having far wider repercussions. Most of us have been brought up to believe, for instance, that the center of agricultural development, animal domestication, metallurgy, in fact the whole gambit of civilization, has been the Near East from where the whole world acquired its share. We have been told that the first temples built by man were situated in the Near East, in the fertile land of Mesopotamia. There, it was thought, in the homeland of the first great civilizations, metallurgy was invented. The knowledge of working in copper and bronze, like that of monumental architecture and many other skills, would then have been acquired by the less advanced inhabitants of surrounding areas, and gradually have been diffused over much of Europe and the rest of the Old World. Well, while



this may be true for Europe and Africa, the new knowledge indicates that it cannot be true for South and Southeast Asia.

Our present knowledge tells us that all of this is extremely Eurocentric, that it is very well possible that agriculture in South Asia may have its origins in Baluchistan and the adjacent areas to its northwest *as well as* in the Fertile Crescent, that the knowledge of metallurgy may have not diffused into Afghanistan and Pakistan from the Near East, that the art, even the idea, of writing in the Bronze Age Pakistan may not have anything to do with Mesopotamia, and that the science of town planning in the Indus Valley in the mid third millennium BC may have an autochnous stamp on it. Similarly, the dispersal of human population in the Stone Age of Pakistan may not have a focal point in the Near East or even Africa, and the 'idea of civilization' may not be the monopoly of Sputh-West Asia.

The litany of complaints about the writing of prehistory by India authors is large, ranging from the extraordinary emphasis on the 'Aryans' as though it was really such an earth-shaking event; their prominent role in starting the 'Indian Civilization' in India, cleverly bypassing the Indus Valley (or making it the Vedic Civilization itself); the treatment of the Vedic literature as though it was written history; dragging the domestication of cattle, rice, and millets squarely into India; placing the origins of the 'Sarasvati Civilization" well within the borders of the Indian Union and its subsequent spread in the Indus Valley; the origins of metallurgy in India; and the like. Same is true with regard to the textbooks of the so-called "Pakistan Studies" in Pakistan, portraying this country as though it was discovered by the Arabs, as though it did not have any prehistory, as though its history starts with Muhammad Bin Qasim or better still with the formation of the Muslim League in Bengal. Everything in the past seems to be revolving around Islam, as though the inhabitants of this land were never Zoroastrians, Buddhists, Hindus, and the like. There is no mention of the Rig-vedic hymns that immortalized the majesty of the rivers and mountains of the Pashtun country and the Punjab and there

is no mention of the Sanskrit literature that developed in this part of the subcontinent. Most importantly, one hardly reads about the origin and spread of agriculture and sedentary living in this part of the world.

Archaeology: Since writing of prehistory is essentially an archaeological undertaking, we must familiarize ourselves with the methodology of this discipline, and the terminology it uses. This section addresses to this need. Simply stated, archaeology is the study of

material remains of man. It studies human cultures through the recovery, documentation, analysis, and interpretation of material remains and environmental data, including architecture, artifacts, features, biofacts, and landscapes. Because archaeology's aim is to understand humankind, it is a humanistic endeavor. Archaeologists are also concerned with the study of methods used in the discipline, and the theoretical and philosophical underpinnings underlying the questions archaeologists ask of the past. The tasks of surveying areas in order to find new sites, excavating sites in order to recover cultural remains, classification, analysis, and preservation are all important phases of the archaeological process.

Archaeology deals with concrete and factual evidence and it covers all periods from the origins of humans millions of years ago to the re- mains of 20th century. Archaeology provides us with the only source of information about many aspects of human development where no written records are available. Milestones such as the struggle for survival of the early man in the Ice Age, his mode of adaptation to environmental conditions, his technological progress, his interaction with other human communities in his surroundings, his migrations, and a number of topics like these fall under the study of archaeology. These, as well as the beginning of agriculture, the origin of villages and towns, or the discovery of metals can only be understood through the examination of physical evidence. Archaeology also provides essential information for periods of the past for which written records of some sort survive. In the context of the prehistory of Pakistan, *Rig Veda* is a prime example of such nonhistorical records.

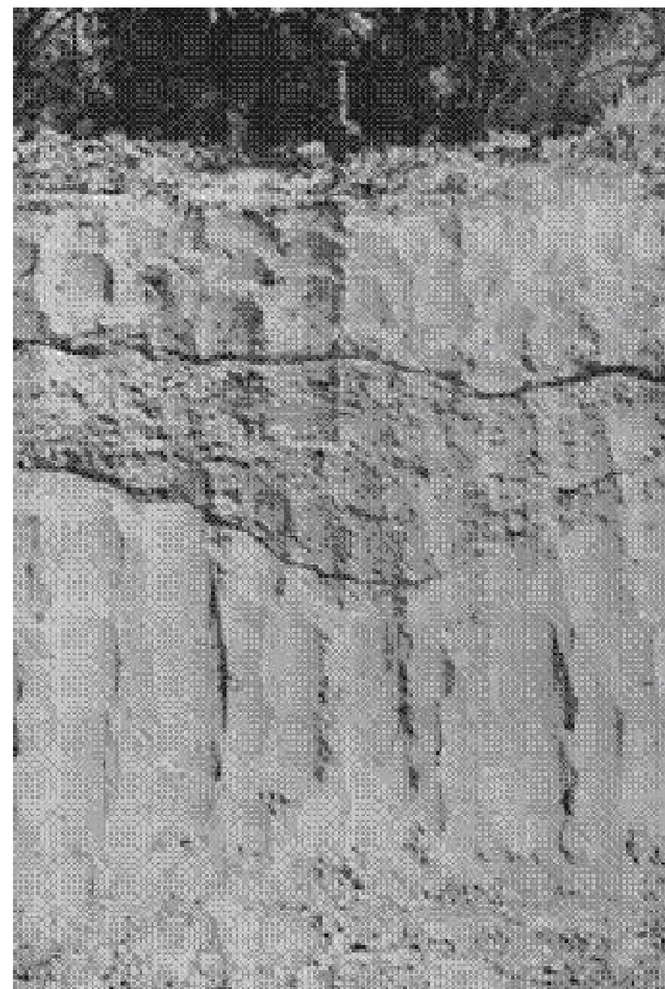
Archaeologists have played a dominant role in the construction of the history of ancient Pakistan, sometimes even to the exclusion of other disciplines. While most attention has been focused on the early Holocene, the Neolithic, the later Holocene and the spread of agriculture have also come in focus, revealing information about human adaptations through time. Pre-agriculture sites, barring a few where excavations have taken place, are known mainly from surface surveys, some of them providing vital information on settlement patterns and landscape use. Several significant surveys have provided important information on chronology and changes in paleo-environments, settlement patterns, and technology. Serious methodological problems, however, pervade archaeological investigations in South Asia, where little attention has been paid to high-precision fieldwork and artifact analyses. Of course, there are some fortunate exceptions to this general criticism.

Archaeology normally relies on observations carefully recorded in the course of surveys and excavation of ancient sites. From this database, ways of life, economic developments and other major factors affecting human societies of the past can be reconstructed to varying degrees of confidence. The further back in time we go, the more scarce and ephemeral become the surviving material remains and traces of human activity. Thus, the role
of archaeology in the investigation of the Stone Age is, obviously, limited albeit essential.

Archaeology links with many subjects, including geography, geology, history, sociology, economics, biology, chemistry, art, religion, and technology. Philology and linguistics are two other branches of knowledge that have aided archaeology in constructing human past. Anthropology is

Introduction **!**particularly important in elucidation of early agricultural societies and the formation of pre-urban social organization. Similarly, *archaeo-botany,* the study of

Killi Gul


Cultural stratum**Cultural stratum between two strata of riverine**bet ween two strat a **silt, of a settlement that was abandoned. Pricier**
of ri verine silt, of a settlement that **was taken in the plains of the Indus**
was abandoned. Picture was taken
(*after Fairservis***)**
in the plains of Indus
between
the *(after Fai rservis)*
plant remains, especially grains or seed, as well as pollens, can tell us not only about the wild grains collected or the crops grown but also about the pre
general nature of assemblage of one
vailing environment. Animal remains are increas
prehistorian understands this lingo; he takes the story told by the archaeologist
artifacts are rooted in specific cultural contexts. So,
and puts it in common language.
the narrow technical meaning of 'culture' in archae
ology can be stretched to correspond to the wider

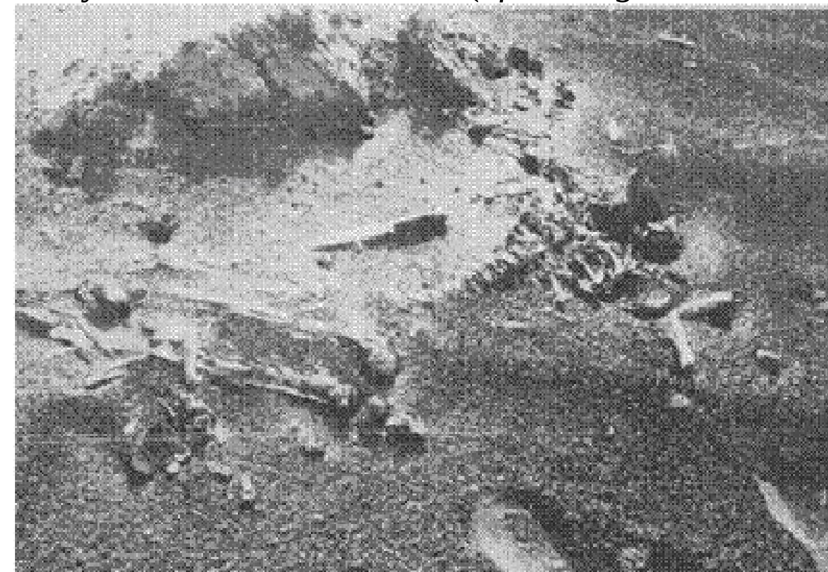
Prehistorians are, however, not a distinct
meaning as commonly understood. The rhythms
breed
altogether.
Some
and patterns of time based on material culture are
prominent
generally slower and longer than those of historical
archaeologists are capable of telling the
events, and archaeological cultures do not coincide
story of human development in plain words
with the rise and fall of dynasties or kingdoms and
although
they
would
use
their
oftentimes are independent of chronological con
special
straints.language when they discuss their findings
Archaeology occupies most of this book. This
with other members of their own species. In
is a discipline that has the advantage of dealing
directly with evidence created at the time in ques
context with the prehistory of Pakistan, we
tion. But it has the obvious disadvantage that such
are lucky to is always fragmentary and have quite a few of them.
evidence sometimes
Almost
all
of
them
very ambiguous, often reflecting trivial aspects of
have
human existence.prehistory of Pakistan as a prehistory of
Two principal methods in field archaeology
are *exploration* and *excavation*“India” and we must do the exercise of. Sites are
places where material remains of past human activ
separating the grain from the shaft.

ity can be identified. Sites of old settlements can be
Archaeology: Simply stated, archaeology is *ar
chaeological survey.* Artifacts, notably pottery, stone

the study of material remains of man. It
treated the
of sites



tools, metal and bone objects, and the bricks or
deals with concrete and factual evidence,
other traces of old structures may be found on the Exposed pottery and othersurface or the settlements, especially in the plains,
which can range from buried cities to logical material on the surface of an may be marked by earthen mounds. Mounds get
microscopic organisms and it covers all
formed over the centuries due to the rebuilding of
periods from the origins of humans millions
structures and the accumulation of rubbish, wind-
blown sand, and other sediments. Continuous habi
of years ago to the remains of 20th century.
Early Indus site in Cholistan (*after Mughal*



The wind-excavated grave of a prehistoric village in southern Siestan (*after Fairservis*)

The wind-excavated grave of a prehistoric

village in
The wind-excavated grave of a prehistoric village in
southern Siestan (*after Fairservis*))
southern Siestan (*after Fairservis*

tation for long periods raises the habitational level much above the general ground level, and the acPage 43 cumulations of habitational material get finally covered by wind-blown dust so as to assume the appearance of a hillock or mound. Sections of such mounds are exposed as rain-water cuts through their slopes, and such erosions enable the archaeologist to see successive '*strata*' or '*cultural levels*', and also pick up artifacts of various periods of habitation. Similar mound-faces or '*sections*' may be exposed by human action, such as when peasants

Archaeology provides us with the only source of information about many aspects
geographical area with
another. An example
those of ingly being studied owing to their importance for of such
both the subsistence economy and the natural environment. Domestication alters body-size and the
comparison would be that between
shape of certain bones, which enables bones of
the Indus Valley and Mesopotamia,

domesticated animals to be distinguished from the wild of the same species. Thusbetween certain sites the Indus Valley *archaeozoology* can shed much light on the development of human con

trol over animals.and those in Turkistan, or between the Indus Valley and the Gangetic

Material evidence is a key to understanding Valleyhuman behavior and experience. It is not enough to describe a stone tool or pot; the challenge is to get the stone tool or pot to tell their stories about the

There are many dimensions on which
people who made and used them. As the products
artifacts can be compared, for of craft traditions and part of the lifestyles of people,

of human development no written records are available. Milestones such as the struggle for survival of the early man in the Ice Age, adaptation to conditions in the Stone Age, his technological progress after the close of the last Ice Age, the various levels of progression in his technology and culture, his interaction with other human communities in

cut into a mound to extend their fields or when there is a cut made for a road.

Sites are often discovered by sheer accident. They can also be discovered by using clues in literature, by regional or village surveys, or with the help of aerial photography. Sites buried underground can be detected by simple methods like inserting metal probes or rods into the ground. There are also the more sophisticated remote-sensing techniques such as LANDSAT imagery. Scanners of LANDSAT satellites create digital images of the earth's surface and can help identify features such as ancient

river courses, canals, embankments, andIntroduction!settlements and 'factories' have thus been spotted. buried settlements. A similar purpose, for smaller areas, is served by

Exploration involves observation only, withrigorous ground survey. Taking a particular spot to

Two principal methods in field archaeology are

represent the base level (zero point), one may

***exploration* and *excavation*.**

particularly arid zones, sometimes winds blow away measure the area of the site and establish the

Exploration involves observation only, without disturbing the physical remainsheights above the zero level and, on their basis,

mains. If these remains are not perishable in the draw contours on a plan or map. This would enable sun, they become visible to the archaeologists or

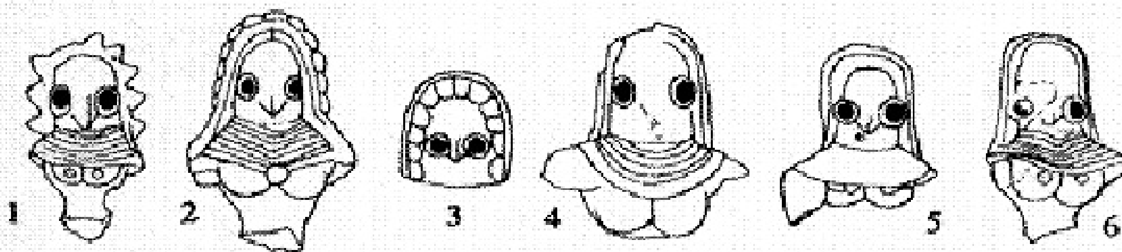
themselves. Sites of old settlements can be located by sight, a process that

one to trace the remains of walls, roads, habita

involves an *archaeological survey.* Artifacts, notably pottery, stone tools, metaltional places, ditches, etc. This low-tech method

found in the archaeological surveys of Pakistan unhas extensively been used in the archaeology of

and bone objects, and the bricks or other traces of old structures may be found on the surface or the settlements may be marked by earthen mounds. Continuous



The so-called "Zhob Mother Goddesses" which are found widely in Afghanistan-Baluchistan border areas. It is a remarkable example of the common cultural expression of the prehistoric times in these regions (*after Fairservis*)

1-Quetta, Damb Sadaat III; 2-Kandhar, Deh Morasai; 3-Loralai, Sur Jungal III; 4-Kandhar, Mundigak IV; 5-Zhob, Periano Ghundai; 6-Loralai, Dabar Kot.

The so-called "Zhob Mother Goddesses" which are found widely in Afghanistan-Baluchistan areas. It is a remarkable exampled of the common cultural expression of the prehistoric times in these regions (after Fairservis) 1.-Quetta Damb Saadat IV; 2- Kandhar, Deh Morasai; 3- Loral, Surjungal; 4-Kasdhat, Mundigak IV; 5-Zhob, Perisano Ghundai; 6-Loral, Dabarkot

The foundations of houses and the remnants of dam walls are visible on the surface. Old walls and ditches as they fall down or fill up can be traced through ground irregularities. Some- times such irregularities are hard to notice when the observer stands on the ground. Aerial photography is a great help here: photographs taken from a plane or balloon in the morning or evening, when the shadows casts are long, show up features of relief that one may otherwise wholly miss. An extensive use of this technique has been made in surveying the Rohri Hills and a large number of Stone Age

Bolan river made a sharp cut at a side of the Mehrgarh archaeological complex and laid bare some of the structures and artifacts for the archaeologist to observe and study. The remains at Harappa were exposed by human action when the contractors started to use the bricks of antiquity in building the Lahore-Multan railroad. Mughal could

easily observe the remains of the Hakra Ware cul

habitation for long periods raises the habitat ional level much above the generalbe used to dissect the strata of different densities

remarkable examples of prehistoric remains just without undertaking blind excavations. This method lying on the surface in the desert of Siestan. An

ground level, and the accumulations of habitat ional material get finally covered

has recently been used in archaeological surveys of

by wind-blown dust so as to assume the appearance of a hillock or mound.

tools strewn on the surface in the Rohri Hills. Of Archaeological evidence does not necessarily

Sections of such mounds are exposed as rain-water cuts through their slopes, and provide a complete picture of the material culture of

time and some of them might be visible on the surancient people. Artifacts found in the archaeological

such erosions enable the archaeologist to see successive *'strata'* or *'cultural*

face. We find such examples in southern Baluchisrecord generally consist of things that have been

levels'

tan where the arid climate has preserved many

thrown away, lost, forgotten, hidden, or left behind

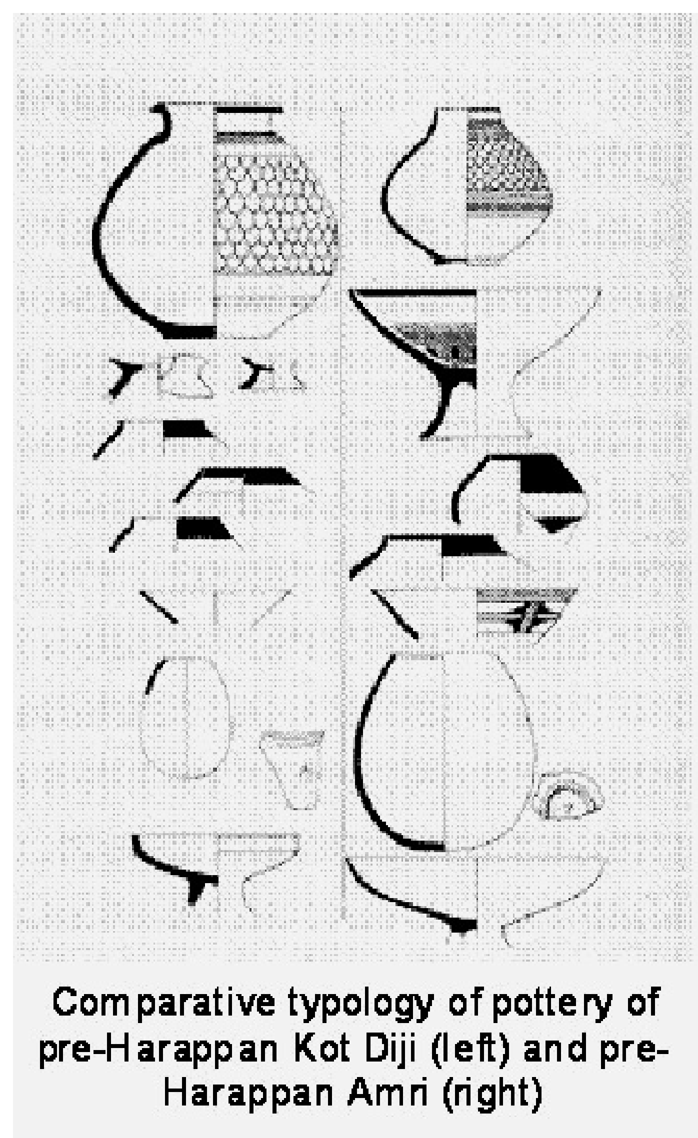
, and also pick up artifacts of various periods of habitation. Similar

stone structures even though they were exposed to (intentionally or unintentionally) by people when

mound-faces or '*sections*' may be exposed by human action, such as whenthey moved elsewhere. Furthermore, not all mate

rial traits survive. Archaeological reconstruction de

peasants cut into a mound to extend their fields or when there is a cut made for a road.[45]



Comparative typology of pottery of pre-Harappan Kot Diji (left) and pre-Harappan Amri (right)

In particularly arid zones, sometimes winds blow away the dust cover and expose the archaeological remains. If these remains are not perishable in the sun,

Geophysical surveying, though expensive and time-consuming, may help to mark the presence of a buried metal tool or hearths; a resistively meter can similarly indicate a filled pit or buried wall. How

much can be achieved by exploration through such geophysical survey has been shown by a combined German-Italian project at Mohenjo-daro

in 1982-83. Finally, the sonic boom technique can
pends on the amount and kind of material that is

Introduction !preserved, and this in turn depends on the objects themselves and on environmental factors, particuexposed by human action when the contractors started to use the bricks oflarly soil and climate. Inorganic materials like stone,

antiquity in building the Lahore-Multan railroad. Mughal could easily observe clay, and metal objects are most likely to survive in the archaeological record. Stone age people must
the remains of the Hakra Ware culture in the arid Cholistan and Fairservis gives have used tools of wood and bone as well, but it is

some remarkable examples of prehistoric remains just lying on the surface in the the stone tools that have survived in large numbers. Tropical regions, with heavy rains, acidic soils, desert of Siestan. Another example would warm climates, and dense vegetation are not favor

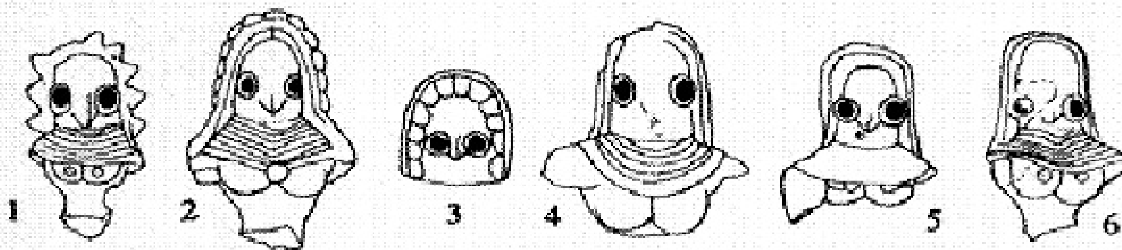
be the thousands of tools of the Stone Age

able for preservation. These things have to be kept in mind when assessing archaeological evidence.man strewn on the surface in Rohri Hills. Of Sites can get destroyed by the forces of nature

course, stone structures can often last quite (e.g., floods, tectonic movements, volcanic erup
a long time and some of them might be

tions), but they are more often destroyed by people when they clear land for farming or build houses,visible on the surface. We find such factories, roads, and dams. examples in southern Baluchistan where the

arid climate has preserved many stone

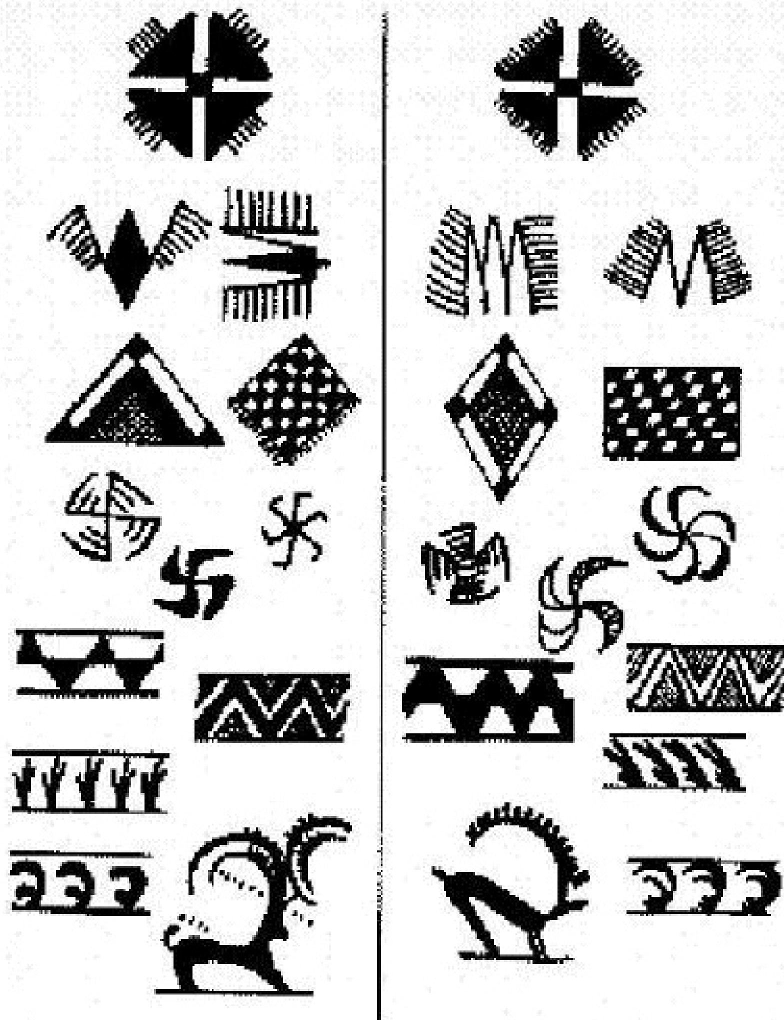


The so-called "Zhob Mother Goddesses" which are found widely in Afghanistan-Baluchistan border areas. It is a remarkable example of the common cultural expression of the prehistoric times in these regions (*after Fairservis*)

1-Quetta, Damb Sadaat III; 2-Kandhar, Deh Morasai; 3-Loralai, Sur Jungal III; 4-Kandhar, Mundigak IV; 5-Zhob, Periano Ghundai; 6-Loralai, Dabar Kot.

irregularities

miss.



of this **Comparative typology of painted pottery designs from Bacum (southern Iran) on the lefty and Bampur (Makran) on the right. Extraordinary similarities show an intense**

Stone Age
cultural interaction between the two regions (*after Fairservis***)**
'factories'

Sites can be explored by carefully examining what lies on the surface or they can be excavated, i.e., dug. Sites are not excavated just to see what they

Page 46

contain, but rather to uncover their stratigraphic sequence. The basic principle of stratigraphy is that if there are different layers, strata, or levels at a site, the lower ones are older. Of course, if a site gets disturbed, this principle does not apply. It is very important to know the *stratigraphic context* of artifacts, i.e., the precise level at which they were found, and what other kinds of things were found

along with them.

Excavations can be horizontal (where a large surface area is exposed) or vertical (where the digging involves a small surface area), and are accompanied by careful recording, mapping, photographing, labeling, and preserving of artifacts. Vertical excavation generally covers a small area, and the excavators remove the artifacts and, if necessary, cut through fixed features of one stratum to reach those of another. Often a 'sondage' or *test tench* is dug, mainly to establish the sequence of cultures or *stratification*. The sides of a trench, whenever exposed or scraped, can show the sequence of the strata, often marked by different coloration of the earth. It may be noted that the layers distinguished upon digging are numbered in Latin numerals from bottom to top. That is, the oldest layer is numbered as I and the subsequently upper layers as II, III, IV, etc. Extensive use of vertical excavation has been made in the archaeology of Baluchistan and Sindh. Since a lot of subjectivity is involved, the excavator's word is not always to be taken on trust. Ideally, the full original record in one form or another is made available to other researchers for *peer review*.

Recording is very important because excavation is destructive - some features of the upper layers have to be destroyed as archaeologists move from one layer to the next. Equally important is the publication of results, otherwise no one except the excavators will know what was discovered at the site. It is satisfying to note that most of the excavations undertaken in Pakistan, barring a few, have been well reported, some within a reasonable period of time and some rather late. However, when we want to learn what was happening on Pakistan's eastern borders in context with the interaction of the peoples across the modern-day political borders between Pakistan and India, we find the situation rather disappointing. A large number of 'Harappan' sites have been ostensibly discovered and quite a few 'Harappan' artifacts have been recovered from these sites but few have been reported. The distinction between Early Harappan, Mature Harappan, and post-Harappan has virtually been eliminated

Because of the poor standard of reporting, no peer reviews are available either. The interpretation of the collected data can, therefore, be questionable. In fact, in the absence of peer reviews, and given the political activism of most of the Indian archaeologists, the whole body of the archaeological work and its interpretation is suspect, especially that emanating since 1960s.

Excavation must be accompanied by close scientific scrutiny of the excavated materials. The *typology* needs first to be determined, that is, the artifacts should be assigned to, and compared with types already established from finds from other sites: this is essential for discovering whether any relationship exists with any other culture or cultures. Pottery often provides the primary material for comparison, since generally pottery is most extensively found at archaeological sites. Archaeologists are, thus, often drawn to making formal comparisons between the artifacts in their archaeological assemblages.Some of these comparisons are close, such as between the various periods of Mundigak, Mehrgarh, Killi Gul Muhammad, Kot Diji, Dam Sadaat, and others. The artifacts from lower strata of an archaeological site are compared with those of the upper layers to see if the changes have been gradual or whether there was any serious discontinuities between the given stratifications. Some of the comparisons are regional, that is between two or three sites in close proximity, to see if the overall similarity of the assemblages indicate the same kind of "culture". A convenient example is the similarities in painted motifs on pottery found in northern Iran, Mundigak near Kandhar, and the Quetta Valley and thus indicating a common cultural base in the region. Some of these comparisons are, of course, inter-regional, for example between Pothwar and Sanghao Cave or between Kot Diji

and Rehman Dheri or even between southern Turkistan and northern Baluchistan. And then, there is an important comparison between the general nature of assemblage of one geographical area with those of another. An example of such comparison would be that between the Indus Valley and Mesopotamia, between certain sites in the Indus Valley and those in Turkistan, or between the Indus Valley and the Gangetic Valley.

There are many dimensions on which artifacts can be compared, for example the shape, decoration, and material of pottery. But, shape or form and decoration are not discontinuous variables. They are arranged on multidimensional continua, so the room for variability is very high. The same is true for material of which the artifacts are made, but it can be controlled in better ways through the use of physical analysis or easily visible differences; the difference between quartzite and chert, for instance. There is a long-standing sense among archaeologists that the affinity between any set of archaeological assemblages varies directly with the similarities they exhibit in generically related characteristics. There is a kind of corollary to this that suggests that the degree of relationship can be determined by the Raetio of shared versus non- shared traits.

Archaeological data are very messy because a mass of detail emerges from even very modest excavateion. The material from large, longterm programs of excavation, such as, in our present case, at Mehrgarh, Chunhu-daro, Kot Diji, etc., can be staggering. But it is this detail that forms one of the empirical foundations on which our understanding of the era stands. Thus, no mater what the detail presented here might be, the serious student will always return to the original source to understand the real meaning of the findings.

Archaeology has moved a long way from the early explorations of burial mounds, undertaken in a cursory manner as a diversionary entertainment for I9th-century gentlemen. Popular impressions of the subject still vary widely, however, from that of intrepid explorers trekking across deserts or hacking their way through jungles, to high-tech excavations in which crouching individuals carefully excavate minuscule flint flakes or delicately brush the soil from fragile bones day after day. The latter is more in line with current archaeological practice, and although it may be less flamboyant than romantic images of exploration, the discoveries that are being made are no less profound and significant. Indeed, within the last 50 years archaeology has grown dramatically to become our major source of information for the past 2 million years of the human story.It is only by appreciating that past that we can hope to understand the world we inhabit today.

The success of archaeology lies in the fact that over the past two centuries, and especially within the last 50 years, the prehistory of humankind has left the shadows of obscurity and moved decisively toward center-stage. The time-span of history, based on written records, remains short - a couple of thousand years or less for most regions. Although rich in detail, history lacks the long-term perspective that enables archaeology to study the origins of human behavior and how human societies developed over tens of thousands of years. Prehistory supplies this perspective.

Interpreting Archaeological Evidence: Interpretation is as crucial in archaeology as in using literary sources. It is involved at all levels, from the seemingly simple stage of classifying artifacts to the framing of historical hypotheses. The study of archaeology today incorporates a diversity of theoretical approaches and perspectives, many of which grew out of debates that took place during the second half of the 20th century. Just as it is possible to identify trends in history writing, similarly, there have been several changes in approach and method within the disciple of archaeology. For

example, Before 1950, many explanations of change in the archaeological record drew on hypotheses of diffusion and migration, as described elsewhere in this section. In the 1950s, however, archaeologists became increasingly dissatisfied with such kinds of explanation, which did not enquire sufficiently closely into how it was that societies changed. It was clear from ethnographic and historical examples that internal processes were generally more significant than external forces; societies were not simply passive recipients of change introduced from outside. In order to properly understand prehistoric societies, therefore, new kinds of thinking were required.

It was against this background that processual archaeology (sometimes called the New Archaeology) arose in the 1960s. It takes its name from the focus that it placed on culture process: not simply recording what had happened in the past, but understanding how and why. The development of processual archaeology in the 1960s is associated particularly with the names of Lewis Binford in North America and David Clark in Britain. Proponents of the new approach drew heavily on ethnographic parallels to interpret the features found in the archaeological record and to understand prehistoric societies as real, functioning entities. At the same time they wished to get away from earlier facile uses of ethnographic analogy, emphasizing that models taken from ethnography must be tested independently against the archaeological evidence. Much use was made of computers, which were just then becoming widely available, and on explicit methods of reasoning, notably the "hypotheticodeductive" technique, in which archaeologists sought to generate hypotheses that they then tested against the archaeological material. The concept of testing was a key element of the new approach. Processual archaeology was also closely associated with the view of culture as adaptation, and with the major role played by the environment in generating change in human societies.

An important feature of the New Archaeology was the focus on formation processes - the processes that have affected the survival of materials from the past, and the formation of the archaeological record. American archaeologist Michael Schiffer has made the important distinction between C-transforms (cultural transformation processes) and N-transforms (natural transformation processes). The former relate to human activities - how sites were built and used, how artifacts were kept or discarded in garbage pits or deposited in graves - and the latter to natural processes such as decay, geological disturbance, and water logging. Some archaeologists wished to extend the study of formation processes to create a body of Middle Range Theory, which would cover the whole of the interface between raw archaeological data and the general conclusions that may be drawn from them. Other archaeologists have sought similar information by living among traditional societies and observing how their activities would be represented in the archaeological record. A classic example of such ethnoarchaeology was Lewis Binford's work among the Nunamiut, a group of mobile huntergatherers in Alaska.

Since the 1980s, alternative approaches have developed, which challenge the assumptions of processual archaeology. This new school of thinking, which is customarily referred to as postprocessualist, rejects the idea that we can ever attain objective knowledge of the past, and questions the reliance of processual archaeology on specific rigid methodologies, such as the hypotheticodeductive approach. Other themes to have emerged within post-processual archaeology include feminist archaeology (both the role of women in the past and today), the archaeology of ethnicity and identity (how groups use material culture to express their solidarity and distinctiveness), and the concept of multivocality, the idea that archaeologists should not be seeking a single official reading of the human past but accepting the validity of multiple alternative interpretations, including those of different members of an archaeological excavation field crew and especially those of living

traditional societies whose past is being studied. This fluidity of post-processual archaeology has been seen as an attraction by some and a hazard by others. It has, however, led to a wider recognition of the important part played by symbolism, belief systems, and individuals in human societies. Most recent archaeological studies draw on elements of both the processual and post-processual traditions.

Archaeology usually provides an anonymous history, one that sheds light on cultural processes rather than events. It is the only source for prehistory, the longest part of the human past, during which many major discoveries and developments took place. It is also the only source for those parts of the past covered by non-deciphered written records, and continues to provide valuable information even after the beginning of the historical period. Unfortunately, once literary sources become available, historians tend to use archaeology as a secondary, corroborative source. One of the current challenges for early history of Pakistan is to adequately incorporate archaeological evidence into the larger historical narratives, as as that deduced from the Rig Veda.



Anthropology: Anthropology, the study of humankind, seeks to produce useful generalizations about people and their behavior, to arrive at the fullest possible understanding of hu- man diversity, and to understand those things that all humans have in common. Physical anthropologists study humans as a biological organism, tracing the evolutionary development of the human animal and looking at the

biological variations within the species today. Cultural anthropologists are concerned with human cultures, or the ways of life in societies. Paleoanthropologists are primarily concerned with the early humans in the Stone Age.

While archaeology tries to reconstruct a prehistoric story with the help of material ob- jects, such as tools, weapons, ornaments, living structures, etc. that have survived the ravages of time, anthropology looks at the fossilized bones of humans and provides the archaeologist a point of reference in the long evolutionary journey of man. Thus, archaeologists are the real authors of this story while anthropologists providing the plot. Anthropology seeks to understand the physical human being through the study of human evolution, adaptability, and primatology. In recent years anthropologists have studied the genesis and growth of civilizations with increasingly greater interest. After almost a hundred years of research into the lives of primitive peoples in Africa, Australia, and India, they have arrived at a series of axiomatic concepts ap



plicable to any of man ’s cultures, no matter how complex. Because anthropology is uniquely equipped to deal with civilization as simply another culture, anthropologists can review ancient civilizations in manner previously unavailable to historians. Just as archaeology derives its strength from such basic sciences as physics, chemistry, and biology, anthropology derives its strength from geology, genetics, ecology, demography, ethnography, linguistics, biology and a host of other disciplines of study and research . At the end, however, it is most intimately connected with archaeology.

EthnobIologoy: Ethnobiology is a discipline that exaines the relationship between living organisms and human culture, whether prehistoric, historic, or contemporary. While this avenue of research can provide crucial clues to our understanding of past societies like the Indus Civilization

and its precursor cultures, the term ethnobiology, and the research it involves, are not always understood, appreciated, or applied appropriately. This is because ethnobiology involves scholars from a variety of disciplines and theoretical schools, whose own areas of expertise are seen as contributing in different ways to the understanding of past cultures. While archaeologists may use archaeobotanical and archaeofaunal data to understand issues dealing with ecology, environment, and subsistence, ethnobiological studies rarely play a prominent role in archaeological explanations. Data derived from once living organisms are all too often


Ethnobiology can provide crucial clues to our understanding of the past

seen as secondary to the material record or settlement systems. Yet it should be remembered that plants and animals are indispensable to human existence, and that understanding the dynamic relationship that exists between these organisms and human societies is as important as the life itself.

Scholars of ancient Pakistan have to contend with its long history and complex layering of foreign and indigenous influences in political, religious, socioeconomic, and linguistic domains. With more archaeological data becoming available, the Indus Civilization and its precedent cultures are being more extensively studied, and better understood than ever. Archaeology in this region now takes an interdisciplinary approach, meaning that the opportunities for ethnobiological research have dramatically increased. Yet scholars studying the plants and animals associated with Indus Civilization or the beginning and spread of agriculture in Pakistan at the close of the Pleistocene have never published their findings within a single volume. Their work either stands alone, or is subsumed within a specific project The only collection of this nature is the book edited by Steven A. Weber and William R. Belcher published under the title *Indus Ethnobiology*. The case studies presented in this book not only illustrate a variety of theoretical approaches and analytic techniques, but also comprise all the major directions that plant and animal studies are presently taking in the study of the Indus Civilization and the period preceding it. We have taken full advantage of this excellent collection of research papers, as they squarely apply to the time period covered in the present volume.

Despite its indispensable importance in the study of old cultures, especially those whose knowledge of subsistence is so crucial in the understanding of their technological level and ways of living,

ethnobiology is relatively new to South Asia. Studies of the humanplant and man-animal relationships in the Indus Age are now beginning to add greatly to our understanding of the people of ancient Pakistan (see, for example 40-50). Studies have ranged from the simple recording of a species accidentally recovered during excavation to a more systematic method of collection and analysis of plant and animal remains.These findinds have played a specially crucial role in the study and understanding of Mehrgarh. With a greater understanding and interest in the natural and cultural processes leading to the archaeological and zooarcheological records, a more theoretically sophisticated discipline is emerging.

Subsistence studies are a major focus of recent archaeological research pertaining to late Pleistocene and the early Holocene. However, this research tends to focus mostly upon hunter

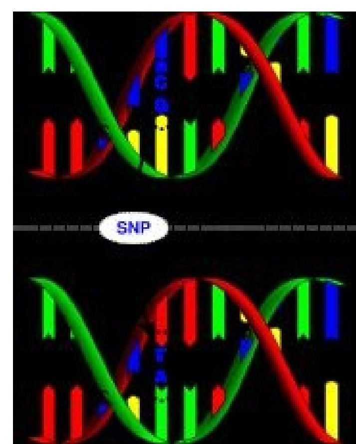


Archaeobotanical data are an indispensable aid to the understanding of the subsistence regime of a society



gatherers and upon the origins of food production. Through the study of subsistence patterns of early ourban societies, we can begin to document and describe food economies that were necessary to maintain and support state-level societies. This material helps us to reconstruct subsistence changes that coincide with the origins of agriculture and the development of urbanism (51). Ultimately, the goal of subsistence studies is to understand social interactions taking place among a highly varied range of producers and consumers.

It is possible to examine aspects of urbanization through changes in the use of food resources. During the transition from village-based to urban societies of the Indus Civilization, the subsistence base broadened from foods that had been exploited for thousands of years, such as wild game, fish, and wild plants, to include new food resources such as domestic sheep, goat, cattle, and domesticated grains. Instead of being replaced by domesticates, wild resources took on a specific role as specialized foods in sedentary communities and urban centers. We can also evaluate the changes that occurred as domesticates were added to an earlier food system, a pattern that correlates with settlement change as small villages became urban centers, or were incorporated into a larger, regional pattern of cultural interaction. Reconstruction of the human diet is a common goal in subsistence studies, as this is crucial to the study of ecological adaptation and subsistence strategies. The most common method is the study of the residues of food consumption and processing, primarily the study of plant and animal remains. Studies in Pakistan and South Asia in general subsistence have been primarily cultural ecological in orientation.
over time, and those fields within zoology and botany, which study the origins and histories of domestic animals and plants.



Genetics: Genetics in general and archeogenetics and population genetics in particular is a relatively new scientific discipline, which is currently undergoing a major growth spurt in the service of prehistory of man. Archaeogeneticists study genetic material drawn from living populations and create their historical interpretations

in several ways, mainly by reconstructing the molecular ages and dispersal geographies of lineage within mitochondrial DNA (mtDNA) and the non-recombining portion of the Y chromosome, or by comparing populations in terms of multiple genetic systems within their recombinant nuclear DNA. Like comparative linguists, therefore, archaeogeneticist draw their data from the present. Genetics has become an important tool in the study of prehistoric man. It is one of the most versatile tool in the mapping of human migrations tens of thousand years ago. Archaeogenetics is a new field and it is still seeking its bearings. Although its contribution to the study of prehistory of man is tremendously important, its verdict is still subservient to archaeology and anthropology. Because of its strong bearing on the prehistory of man, we devote a full chapter in this section to the fundamentals of genetics and their possible application to the study of the prehistory of man.

Archaeological History of archaeological research in the Indus Age is invariably told and re-told from the point of view of the discovery of Harappa and Mohenjodaro. This is a rich and fascinating history and through its shear brilliance it overshadows the painstaking work that brought a large number of pre-urban sites to light. The pinnacle of this research was, of course, the Mehrgarh site in the Kachi plain. It exposed the settlement history of the early inhabitants and elementary agriculturists of several thousand years duration at one single place. Of equal importance were the discovery Early Indus sites, such as Amri and Kot Diji, which connected the village farming communities of the Indus Valley to the rise of the urban civilization typified by Harappan and Mohenjodaro. Unfortunately, this story has not yet been compiled. In the followings, we offer a glimpse of this research in somewhat chronological order, concentrating on major discoveries and leaving a much longer list of other discoveries.

Amongst the earliest sites explored in one of the most difficult and now inhospitable terrains of south Baluchistan is the Dasht River valley: some of these sites were brought to archaeological notice by Major Mockler in 1876. (52). Somewhat later, in 1898, Dr. Nettling traveled through Baluchistan and first indicated the archaeological importance of

Research in Pakistan:

Geology: The study of early human populateons is intimately connected with several other scientific disciplines, of these geology is probably the most important. Geology is the science of the birth and

growth of,

and changes in, the earth we live on. It includes the study of the organisms which inhabited our planet. A very important part of geology is the study of how Earth‘s materials, structures, processes and organisms have changed over time. Geological surveys of northern Punjab in 1932-35 is the starting point in the paleolithic research in Pakistan. It is through these geological surveys that a window to the Stone Age was opened up. The application of geological concepts is particularly useful in the study of the Stone Age because the former deal with the extraordinary long periods of times in which the events of the Stone Age have taken place. We also have paleoclimatology and geomorphology, both studying changes in the earth‘s environments Loralai and the Zhob valley sites, especially Periano Ghundai, Rana Ghundai, and Dabarkot (53,54). Then came the discovery of Nal, in 1907 by some British army officers. It was first excavated in 1908 by the Hazara Pioneers under the command of Cot. Jacob, but there is no record of the antiquities found here. In 1925-26, H. Hargreaves explored this site once again and a few adjoining sites in the Jhalawan tract of Baluchistan. geographical extent of

At the same time, exploration work was
terials. Though Ross was a military officer and not

Majumdar’s and Stein’s explorations. Stein made further discoveries in the Thar also undertaken in Sindh. In 1925-26, K.N. Dikshit formally trained in excavation techniques, his findexamined two sites in Sindh proper - Lohumjo-daro,

Desert and in Las Bela in the early years of the World War I, again adding to our ings are of permanent value.
on the Indus; and Limo Junejo, up in the north in the
knowledge of the extent of the various types of regional cultures of ancient
In 1938 seven years after his last explora
upper Sindh frontier district. These works were still Pakistan. Several other names of archaeologists must be mentioned here who

From 1935 to 1940, while in command of troops in the Loralai and Zhob districts of British Baluchistan (and possessing special facilities for travel,) Brigadier E.J. Ross made a fairly complete study of some of the previously explored sites in that area and also located a number of new ones (59). While conducting excavations at Rana Ghundai, Ross made history by unearthing pottery and

the various prehistoric
cultures
as
the
artifacts which closely resembled north Iranian ma
result of



primarily sporadic. It was Aurel Stein in Baluchistan and N.G. Majumdar in Sindh who first put these regions on the archaeological map. In 1927, Stein

(55) undertook a detailed survey in Waziristan and northern Baluchistan and discovered a number of chalcolithic sites in the Zhob and Loralai valleys. Periano Ghundai, Moghul Ghundai, Rana



Majumdar
(*after Possehl*)

bright young archaeologists were trained in

Gedrosia (43). He exproper methodology, who proved to be treasure for Ghundai, Sur Janplored Las Bela exten

tion, Majumdar, Krishna Deva and Donald E. Macon
(60)
contributed to this pool of knowledge but the space
resumed work in Sindh, surveyed the area
north of Johi, constituting the foothills of the Kirthar

would not permit us to do so. Gregory Possehl has
range and the adjoining hills and plains. More than *Indus Age* –done justice to these contributions in his

half-a-dozen chalcolithic sites were found. Of these *the Beginning.* Rohel-jo-Kund and a few others were important in
that they showed a mix of Nal and Amri cultures.

In the last three years of British India, Mortimer
Wheeler
was
the
From December 1940 to March 1941 Stein (61,62)
Director General of the crossed the Indus river into the Bhawalpur region.
Archaeological Survey of India. He noticed the
He surveyed the remains of an ancient occupation appalling situation of the methods used inalong the Ghaggar-Hakra riverbed and located a
archaeological excavation of sites and recording and
large number of chalcolithic sites along the river
reporting of the data. It was through his efforts that a
bed. In March 1943, he undertook the last survey of fewhis eventful life in Las Bela and the southern part of
gal,
Dabar kot are future work in Pakistan. Dani, F.A.Khan, and
Durrani,
were
some
sively but found only
of
them.
Several other
some of the imporone important chalco
tant sites he brought
lithic
site,
Niai
archaeologists were trained in the USA, Mughal
Buthi,
Majumdar to light. In the conbeing one, and several more sharpened their skills
near the town of Bela.
tinuing
through
field
season
working
with
a

number
Between 1942 andof foreign
of 1927-28, Stein
1945,
Stuart
Piggott
archaeological missions. It is through these foreign traversed, with great did some exploratory
success, southern Baluchistan and the arid regions
experts and the sane policies of the Government of
work in the Quetta Val
of Kharan, Sarawan, Jhalawan and Makran (56). He
Pakistan in allowing and assisting foreign missions
ley and examined the
discovered more than a hundred chalcolithic sites of
to explore in Pakistan that the Amri culure was
ceramics from earlier
which Kulli, Mehi, Nundara, Shahi-Tump are out
discovered. It is also these people who later worked
excavations. It is on
standing ones. At a number of these sites, Stein laid
this basis that he pre
with some prominent French excavators to explore
trial trenches for chronological and cultural pur
sented a synthesis of
and excavate one of the most important prehistoric
poses. Significantly, most of these sites have not



Sir Aurel Stein
(*after Possehl*)

Baluchi cultures in his **Sir Aurel Stein**
been dug after him, though they were visited by
sites of Pakistan, Mehrgarh in the Kachi plains. It is
Prehistoric India (11).
Fairservis and Mughal in later times.

one of them, Mughal, who discovered an important In1946,
phase of prehistoric culture, the Hakra Ware, inBetween 1929 and 1931 MajumdarWheeler came to India

Cholistan. The discovery of Gumla, Lewan, Sanghao Cave, and others also go to explored the lower Indus and the hilly tracts of Johi,with his own techniques of excavations and uncovSehwan and Kohistan in Sindh (57). He succeededthe credit of these souls.
in discovering sixty-two sites of which half were
prehistoric. One of the Majumdar's outstanding con
ered an occupational deposit underneath the mudbrick defense wall at Harappa, on the western edge

of
the
mound
(65,66,67).
This Investigation of the Stone Age was neglected. One of the high points of this
established pre

activity is the joint expedition by the University of Yale and Cambridge in 1935, tribution was the discovery of Amri where Period I,Harappan occupation of the Punjab. After the Partiwith its distinctive pale bichrome ware, was con
fined to the lower strata and, therefore, clearly Early
Harappan. This culture with a super-imposed transi
tional phase was followed by the mature Harappan
complex. In 1932, Stein turned his attention to the
south-eastern tracts of Iran, which, in fact, is an ex
tension of southern Baluchistan (58). Here he dis
covered the signicant chalcolithic sites of Bampur.
Khurab, Katukan, Damin, Chah Husaini, Tal-i-Pir
and Tal-i-Iblis.
tion in 1947, the first archaeological survey was conducted by Beatrice De Cardi in association with the DepartmentPage 61 of Archaeology, Government of Pakistan, in 1948 (68,69). She traveled long distances in field trips to Kalat and explored 47 sites, of which 21 had not been previously known. Anjira and Siah-Damb, two very important sites of this region, were explored. Her journey extended from Quetta to Khuzdar. In the same year, she also visited Afghanistan where she followed the routes from Kabul to Kandahar and Farah.

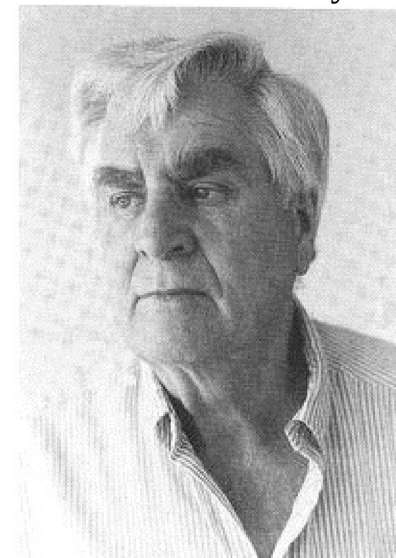
Discovery of Ancient Pakistan: Curiously enough, the discovery of the great prehistoric civilization of ancient Pakistan, which led to the systematic study of the ancient remains in Sind and Baluchistan and with which this volume largely

Preliminaries
deals, was the accidental result of colonial development in Punjab. It is an
After Sir Aurel Stein, it was Walter Fairson pre-Harappans and helped de Cardi's efforts in
interesting saga and Stuart Piggott and recently Gregory Possehl and others have
ervis who undertook a number of surveys of the the same direction.
dealt with it eminently. Briefly speaking, as the excavation at Mohenjo-daro

Quetta and Kandhar region in a most systematic From 1958 to 1967, the Department of Armanner. In the summer of 1949, accompanied by chaeology,
Pakistan, led by M.R. Mugha], onceproceeded in 1922 onwards, that great explorer of Asia, the late Sir Aurel Stein,
Louis Dupree and Henry Hart, Fairservis made a
very successful trip to Afghanistan in the course of
again explored parts of northern Baluchistan, and
undertook to survey the little-known areas of Baluchistan on the extreme westernsome selected areas in the Greater Indus Valley - a
which he surveyed the territory from Bamiyan toedge of British India and to search for prehistoric sites: his two journeys, interm given by Mughal himself (78). The exploration
Kandahar, Farah, the northern Seistan plain and the offered several new interpretations of the archaeoNorth Baluchistan and NWFP in 1926-27 and in South Baluchistan and Iran in
Helmand valley south of Kajakai as far as Kirtaka logical problems of this region.
1927-28, brought to light a vast amount of material of first rate importance for
(70). This was known as the first Afghan expedition. In 1960 archaeologists turned their atten
Surface findings indicated that prehistoric sites werelinking the prehistory of Pakistan with the other areas of similar stages oftion to the Makran coast. An expedition from the
meager in southern Afghanistan. However, traces of American Museum of Natural History went to the painted
pottery
and
development in Central Asia and Iran. Stein's campaigns were essentially those
Diwana where, in 1955, a limited survey of the

flint working were reconnaissance: he made few excavations beyondPasni area had already been undertaken by Henry found north of Juwaintrenching sites here and there, and collected mainlyField (79). The results were quite encouraging and, in Seistan and in the therefore, more expeditions followed. Soon the

surface indications of ancient habitation in the form of
Helmand river valley coastal strip was thoroughly investigated by Dales


Walter A. Fairservis of

the all-important potsherds which contribute so much toin the fall of 1960 when the University from Afghanistan they Museum of Philadelphia, with the collaboration ofthe archaeologist's knowledge of the past.

briefly visited the
Quetta-Pishin area,time
and a number of sites
the Pakistan Department of Archaeology, conducted a six-week survey of the desolate Makran coast.
During the same period, Hargreaves partially
The purpose of the
were examined.
excavated a cemetery and a settlement in Baluchistan in
expedition was three

1925, and produced important evidence, which amplified April 1951, the second Afghan expedition was

and
Sind and the Indus plain Zhob-Loralai ar
between 1927 and 1931,
defining thedown the Bolan Pass, beyond the Aab-i-Gum railof the minor prehistoric extent
way station, to Nushki in the Chagai district and settlements within the area dominated by the Indus
also to Mastung in Kalal. Five sites in the Quetta
valley and one in Loralai were excavated (71,72).city of Mohenjo-daro. He was undertaking fresh
In the survey in Afghanistan Fairservis located five
fieldwork in 1938 when he was killed by Sindhi
prehistoric sites in the Kandahar area two of which
bandits in the Kirthar Hills.

were tested by exploratory trenches (73). The survey in Afghan was, however, brief of but still a twoSuch, then, was the state knowledgemonth journey to Afghan Seistan resulted in the

discovery of a number of chalcolithic sites in theprehistoric Pakistan at two major cities and one
Afghan portion of Siestan.smaller town in the Punjab and Sind, trial trenches In the spring of 1951, another foreign mis
dug in several sites in Sind and Baluchistan as well of
sion, the French Archaeological Mission to Afghani
archaeologist, launched in which surN.G. comprehensive veys were undertaken
survey
Walter A. Fairservis, Jr. in the Quetta-Pishin
stan, began field studies of prehistory under J.M.
as in Iranian Siestan, and a fair idea of

Casal. Mundigak was spotted during this survey and subsequently excavated (74) For a number of years Mundigak with its long cultural sequence, was a key site in this region against which the differentPage 60 cultures explored were measured and positioned. Explorations and excavations continued to solve the problems of prehistoric cultures in Pakistan.

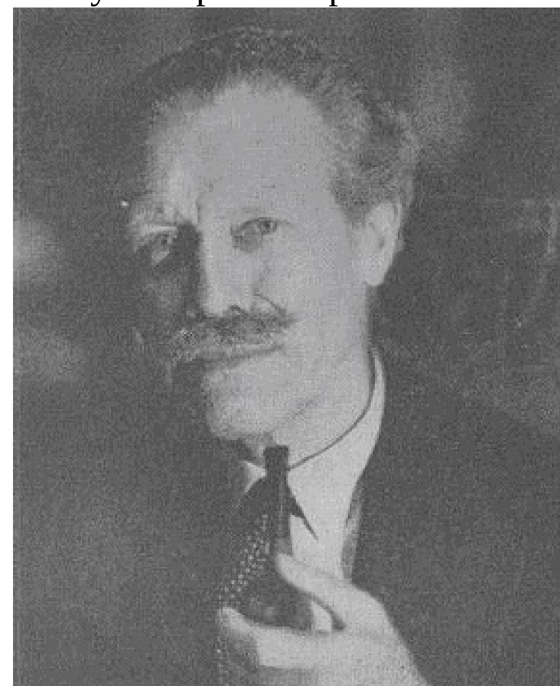
During 1955-1957 F.A. Khan (75) conducted large-scale excavations at Kot Diji, an Early Harappan site in Sindh and probed the well settled occupation phase before the advent of the Harappans. In 1958, De Cardi excavated two sites, Anjira and Siah Damb in Kalat region (76,77) for preHarappan levels.

In Sindh, during 1959-1962, Casal (74) excavated at Amri and unearthed supporting evidence which, in a way, confirmed Khan's views

the
portant
information
Stein’s own remarkable results. A brilliant young Indian
on the geography of
Majumdar, the coast, to searchcarried
of
for traces of ancient

habitations and to reexamine the site of Sutkagendor. Because of its strategic importance in eastwest trade, S u t k a g e n d o r w e s surveyed for over two weeks with exploratory trenches. The survey also led to the discovery of an ancient sea-port, known as Sotka-Koh. The French Mission was still active, and Casal, in 1961-62, revisited a number of sites scattered along the borders of Makran in the Bela area and also in Baluchistan in the Porali and Kud

valleys. He picked up



Mortimer Wheeler

a Kulli Culture site,

Nindowari-Damb, which lies on the right bank of the Kud river, a tributary of the Porali river and conducted important excavations there (83)

The field year 1966-67 opened new vistas for archaeology. Four archaeological excavations unaware of each other, simultaneously worked on four crucial sites of the Iranian Plateau (southeastern Iran) and all four have added new dimensions to the protohistoric culture of the region. Tal-iIblis in Kirman, was excavated by Caldwell, head of the American expedition. The evidence collected showed it to be the oldest metal-working center in the Iranian Plateau, going back to the seventh millennium. Tepe Yahya, also in the Kirman region, was excavated by the Peabody Museum expedition, led by C.C. Lamberg-Karlovsky. Evidence collected

out a


Stuart Piggott

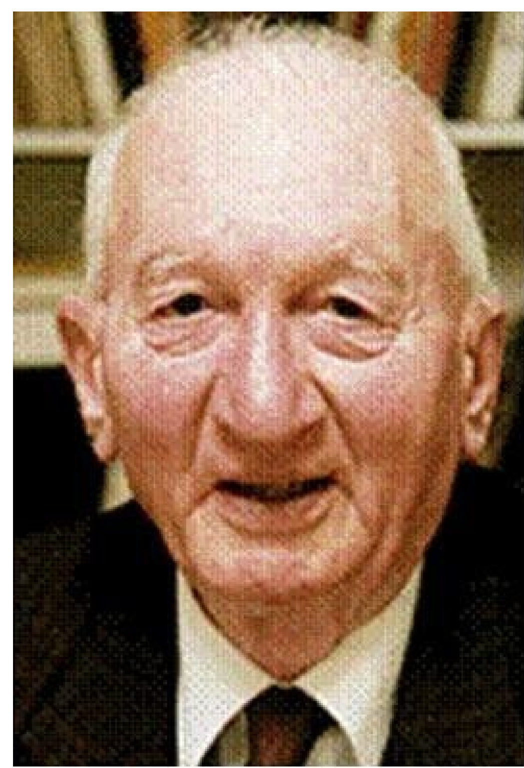
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6-!"*"+'9$ @"#-/$ (,-*/$ 1.//)0(*"+$ *"46)-"1-3$ (,-$ "-7-/$ A Prelude to Civilization

showed it to be a soft-stone working center which supplied chlorite vases, both to eastern and western markets. Bampur, another important site in Persian

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Baluchistan, was excavated in the same period, by
*;0./(!"($

B. de Cardi: it lies on the trade route which connected Baluchistan with Kirman. And finally, Shahr-i Sokhta, located in Iranian Siestan, was excavated by Tosi. A third millennium settlement was found, showing links with south Turkmenia on the one hand; Quetta on other; and Bampur on the third. The discovery of a Lapis workshop is another fasci

nating discovery of the site.
*!"#$%"&' ()*+$,&-"*9$ F".(,-/$ Q!8*'(!"*$
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Professor A.H.Dani

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Professor A.H. Dani

$

In Afghanislan, in the winter of 1970-71, the Archaeological Mission of the American Museum of natural History led by Jim Shaffer (84,85) returned to Said Qala Tepe to excavate a protohistoric village site in Afghanistan. Adjacent to the borders of eastern Afghanistan, Dani (86) explored the Gomal river in the 1970-71 field season. He discovered eleven new sites in the Tank Dera Ismail Khan region of

which Gumla, Hathala Karam Shah, Rehman Dheri, Hisam Dheri have been significant. Limited excavations were undertaken at two of them, Gumla and Hathala. Gumla proved more productive by showing a continuous sequence Harappa culture.

In 1972, Mughal Baluchistan and the Upper Indus valley to record all kinds of ancient sites and monuments belonging to different periods. The aim was to re-examine archaeological evidence from these sites in the light of important discoveries made in the adjoining areas of eastern Iran, southern Afghanistan and the Greater Indus Valley and for possible cultural and chronological reconstructions. The results were extremely satisfactory.

Possibly the most remarkable discovery of the prehistoric Pakistan was made at Mehrgarh, a large site with a long sequence of pre-urban Indus cultures located at the foot of the Bolan Pass. The excavations were done under the guidance of J.F. Jarrige of the French Archaeological Mission (88). The excavations completely revised the views about the prehistoric cultures of Baluchistan. They have made Baluchistan a nuclear area for the growth of urban cultures in the subcontinent and taken it off the list of secondary refuse areas. This site has yielded the sequence of cultures right from prepottery neolithic to the advent of the Harappans. The set was visited again in mid eighties and the from the

neolithic to

(87) explored northern various discoveries were re-evaluated and reanalyzed.

In 1976-1977, the excavation at Rehman Dheri, near Dera Ismail Khan was jointly undertaken by the Archaeology departments of Peshawar University and the Government of Pakistan, led by F.A. Durrani (89) The excavation yielded for the first time, the formative stage of the pre-Harappan Kot Diji Culture, later named the Early Harappan or Early Indus. In 1950s extensive excavations were conducted at Kot Diji by F.A. Khan and G.S. Ghurye of the Pakistan Department of Archaeology. Amri, also located in Sindh was originally excavated in 1929 by Majumdar and then by Casal in 1959 and 1962. More recent work in Sindh was conducted by the Italian Mission during 1980s under the leadership of Paulo Biagi. The team discovered and mapped several Mesolithic sites in Upper Sind. Amri is also located in Sindh.

Analyses and Syntheses: Much had been explored and excavated, and also published. But the synthesis of all this material was attempted at a very late date, by Stuart Piggott in 1950 in *Prehistoric India*. He used the Iranian Cultural frame()*+,-$./%,0%12$%3456*%7)-)8)9"1),4work to understand Indus material. While doing so

he had to adopt the stimulus diffusion model as providing the explanatory force in understanding the!"#$ %&$ '()#&*"+$ (,-$!%)"#!"($ -(,".+/!0,*1$ -2*#-"1-3$ ')1,$!'$ (,-$ 1/!4($ (-1,"*5)-'$ .4$ cultural developments in Baluchistan as well as in(/!#*(*."!6$0.((-/'$!"#$',-66$7./8-/'9$:/.;$(,-$7./8$.4$(,-'-$(-!;'$7-$!/-$+!*"*"+$!$4!/$ the Indus Valley proper. His concluding remarks 16-!/-/$)"#-/'(!"#*"+$.4$(,-$6!&.)($.4$(,-'-$1*(*-'$!"#$,.7$(,-&$.0-/!(-#9$$$$clearly establish his

approach. "So far as $



M.R.Mughal

<,-$;.'($India is concerned,1.66!%./!(*."'$ 7!'$."$ (,-$ 5)!6*(&$ .4$ 7./8$ 7,*1,$ 7!'$therefore, we must

look westwards for the
introduction of arts of
agriculture and it will /-;!*"-#$1."(*")!66&$-=0.'-#$(.$;.#-/"$;-(,.#'3$(,-*/$7./8$ be seen throughout 7!'$ -=(-'"*2-6&$ 0--/>/-2*-7-#3$!"#$!$,*+,$ '(!"#!/#$ .4$this book how the In/-0./(*"+$ 7!'$ +-"-/!66&$;!*"(!*"-#9$ <,*'$ 7!'$ *"$ ',!/0$dian material can be

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western Asi(,-$ 1,!*/'$ .4$ *"46)-"1-$!($ (,-$ "-76&$ 1/-!(-#$ *'"(*()(-'$ .4$ atic setting." (11). This 6-!"*"+'9$ @"#-/$ (,-*/$ 1.//)0(*"+$ *"46)-"1-3$ (,-$ "-7-/$book has served as a
text for a long time,
but is now a com:;<;:6#2"8% '1,.6!/',*0$*"$!/1,!-.6.+&9$pletely outdated one **M. Rafique Mughal**
because we presently <,-$ A-0!/(;-"($know that this regions $-=1!2!(*."'B$4./$-=!;06-3$*"$CDEE3$:9F9G,!"$*"*(*!(-#$!$0/.H-1($!($G.($A*H*$*"$?*"#9$<,*'$ *not have* to look westwards for its cultural ori
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53 these prehistoric cultures was made by B. Subba!6'.$ 1/-#*(-#$ 7*(,$ 1."#)1(*"+$ -=(-'"*2-$ ')/2-&'$ *"$ (,-$ J"#)'$ O!66-&$!"#$ P!6)1,*'(!"9$rao in his *Personality of India* (1958) wherein he
adopted the geographical model for understanding<,*'$ 7!'$!$;!H./$'(-0$ (.7!/#$!$ 0/.+/!;$ .4$ .2-/!66$06!""*"+$ 4./$4)()/-$!/1,!-.6.+*1!6$

the cultural diversity of Indian subcontinent from prehistoric times to this day. This was, however, in0)%6*',-#$ *"$,*'$ 6*%-/!66&$ *66)'(/!(-#$ /-0./($ the form of a long essay, and therefore, of limited!/1,!-.6.+*'($ .4$ *"(-/"!(*."!6$ /-0)(-3$ Q/.4-"./$ A!"*3$ but still significant value.The third attempt in this-=06./-#$(,-$!/-!$!/.)"#$(,-$R.;!6$!"#$P!"")$O!66-&'$%)($ direction was made by D.H. Gordon in 1960 who

followed Piggott in his observation: “It must be ad,*'$;!*"$1."(/*%)(*."$*'$(,-$-6)1*#!(*."$.4$(,-$6."+'(!"#*"+$

mitted, however, that such a widespread change /-6!(*.'",*0$ .4$!"1*-"($ Q!8*'(!"$ 7*(,$ M-"(/!6$ F'*!9$ S4$ 1.)/'-3$ (,-/-$ 7-/-$ '-2-/!6$ F;-/*1!"3$ P/*(*',3$ R-/;!"3$:/-"1,$!"#$ J(!6*!"$!/1,!-.6.+*1!6$;*"*."$ 7,.$ 1.'"(!"(6&$ 7./8-#$ *"$ Q!8*'(!"$ *"$ 1.66!%./!(*."$!/1,!-.6.+*'('9$$

over a considerable area from food gathering to peasant farming and from communities in most cases with no pottery to an equally widespread use of wheel thrown pots with decoration showing a long tradition of this art behind it, must be the result of a considerable body of the peopl*e* who were accustomed to this more civilized mode of life” (91) *The Prehistoric Background of Indian Cultur*e included many new discoveries which were not available to Piggott, but in his love for a shorter chronology of each period of the regional prehistory, Gordon has not allowed it its due.

In the year 1966, Wheeler published his *Civlization of the Indus Valley and Beyond*. Following

Childes, Piggott and others, he wrote that the cultural development in Baluchistan, throughout the third millennium, was the direct result of diffusion from the Zagros mountains and Mesopotamia. This was practically the same stand he took in 1953 in the *Indus Civilization* and which was followed by Subbarao, Gordon and the Allchins. In 1968, *The Birth of Indian Civilization* was jointly written by F.R. Allchin and B. Allchin, in which the authors tried to thread all available evidence with the same diffusionist views in mind: "Through it (Baluchistan) wave after wave of immigrants and merchants have

passed traveling


Richard Meadow

both to and from I n d i a p r o p e r. " (92). *The Birth of Indian Civilization* was revised in 1982 and upblished under the new name: *The Rise of Civilization in India and Pakistan* (14). This book was a great improvement on the previous one in that, for the first time, due place was given to the results of scientific methods applied to sub-continental archaeology. Even subjects like the settlement pattern, agriculture, metallurgy, etc., found full treatment in separate chapters. Despite this important improvement, the synthesis suffered from an undue stress on the relationship of the Greater Indus Valley with the rest of the subcontinent, a relationship that was practically non-existence in the prehistoric past of this region. The Allchins' insistence on treating the archaeology of Pakistan as a part of India seems to be its biggest shortcoming.

In 1960, H.D. Sankalia wrote his *Prehistory and Protohistory of India and Pakistan* and revised it in 1974 in a new edition. His synthesis also came to the same conclusion that the Indus cultures emerged from the cultural traits received in the area from the western Iranian Plateau. But his treatment was not analytical and rather discriptive in nature. Anyhow, he is more concerned with cataloging his Paleolithic stone tools which he found in western India and discussing the Malwa and Jorwe cultures in isolation but still connecting them with the Iranian protohistoric cultures. In terms of a synthesis. Sankalia's efforts in this book is definitely overrated and without much merit. This was followed by Fairservis with his Roots of Ancient India wherein he, like others, attributed the very *raison d' etre* of Baluchi cultural complexes to the Iranian Plateau Undoubtedly, his conclusions were based on his own large scale field works studied in anthropological models.

In 1970, Mughal in his Ph. D. thesis entitled the *Early Harappan Period in the Greater Indus Valley and Northern Baluchistan* (78) offered enormous details of early cultures of Baluchistan and the Indus Valley. His basic approach was different, in fact radical. He opted for an outochthonous model than the diffusionist, but still admitting the role of western cultures on the Indus indigenous cultures. He observes: "The Archaeological evidence indicates that northern Baluchistan enjoyed a central position in receiving and transmitting cultural influences from and to the regions on north-west and the Greater Indus Valley on the east (78). A taboo was, however, broken.

In 1965, George Dales was the first to provide chronological correlations within a theoretical frame work of total archaeological assemblages in Afghanistan, Baluchistan and the Indus Valley. He c o n s

p i c u o u s l y avoided any emphasis on invasion, ideas, Ubaid, or Early Dynastic horizons emanating from the west. Dales's, emphasis, on the other hand, was on internal developments and indigenous process. He casted Afghanistan and Baluchistan in their proper role as the homeland for the development of the various cultural, social, and economic experiments that provided the necessary antecedents for the rise

Jim Shaffer


Paulo Biagi

A Prelude to Civilization

of civilization in the Indus Valley (82). In 1978, Jim

Shaffer (84,85) brought out his Said Qala Tepe re port. Here he attempted to provide an alternative to diffusion as an interpretative framework for the birth and growth of the Indus cultures. Dales insisted on the role of nomads in the cross-current of cultures.

In the year 1979, Gupta while writing on Soviet Central Asia and its connection with the Indo Iranian Borderland, placed Baluchistan in its proper perspective (64). In the light of new discoveries at sites like Mehargarh, he made frontal attacks on the diffusionist model. He designated the prehistoric cultures of Baluchistan indigenous, with their own peculiar environment, and refused to view them as just the off-shoots of West Asian Cultures

Finally, Gregory L. Possehl in his various writing during 1980s and 1990s put the diffusionist theory at rest. In 1999, Possehl compiled a large volume on the pre-urban cultures of the Indus Val ley under the title I*ndus Age - The Beginning.* This was a bold attempt to challenge some of the well accepted theses regarding the origins of agriculture and sedentary living in Baluchistan and the founda tion of the urban civilization that arose in the Greater Indus Valley in the third millennium BC. Like S.P.Gupta, he emphasized the role of pastoral nomads in the spread of cultural traits within the Indus region rather than relying on a naked diffu sionist theory. He also expanded the ‘nuclear area’ of civilization, which was restricted to the Near East thus far, to include hilly flanks of the Iranian Plateau which includes southern Turkmenia and Baluchis tan. The discoveries at Mehrgargh and their recent analyses have lately put a serious dent on the purely diffusionist view of the Indus cultures.

Since these writings, a host of other treat ments have been coming to light with a fresh look on the relationship of ancient Pakistan with the west. Although some beginning has already been made by a few ‘Marxist’ historians of India, Paki stan’s cultural relationship with ‘India” in its prehis toric times has not begun to be examined seriously. The obsession for treating Pakistan’s prehistory as a part of the prehistory of India still persist.

I.5. Chronology



Few things are more important in archaeology than chronology. At the same time, it is one of the most unstable and poorly known aspects of the story of man. This disappointment is compounded by the fact that there is no agreed upon terminology for stages, phases and periods

in describing the cultural development of early humans. As a result, the study of prehistory is rather blurred and its various developmental stages are somewhat ill-defined. The lack of agreement on the terminology of cultural change in Pakistan's archaeology is particular glaring; this means that the prehistorians are forced to develop them on their own. None of these schemes is entirely satisfactory, in part because of the gradual increase in our knowledge and the differing assumptions, disciplinary predispositions and perspectives of those who created the schema. In this framework, the historian dons the cloak of an anthropologist and traces the progress of man through the examination of his stone tools, architectural remains, pottery and the fossilized material that occasionally becomes available. Occasionally, he or she may seek help from archeogenetics. In so doing, though, the old threefold classification of the Stone Age, the Bronze Age, and the Iron Age is still maintained and the threestage division of the Stone Age (the Early, the Middle, and the Late Stone Age) or that of the Paleolithic (the Lower, the Middle, and the Upper Paleolithic; the Mesolithic thrown in for good measure) is maintained in one garb or the other. The reader will find the echos of this approach resonating throughout this book.

We are better situated in the Neolithic times and are somewhat more confident in the periods thereafter. However, uncertainties remain. What adds to the difficulties, and the interest, of this period is that no absolute dating techniques were available till very recent times. As a result the diverse structures of relative time used by early prehistorians are more clearly evident than in the work of prehistorians today. What makes this pioneering work a period of interest is that many of the temporal structures developed at the time have remained central to the practice of prehistory into recent times.

Relative and Absolute Chronology: Chronology is of two types, *relative* and *absolute*. Relative chronology dates prehistoric events in relation to other events. It only tells us if a particular event is earlier or later than another event. Absolute chronology, on the other hand, dates events and phenomena in solar calendar years. Relative dating methods produce ages, stages, phases, and periods that can be ordered relative to one another but need to be calibrated against a numerical age to get anchored on a timescale. Numerical, i.e., absolute, methods produce quantitative age estimates that can be placed on a standard timescale, commonly expressed as 'years before present' (BP) or 'years ago'. This chronology is based on physical techniques and methods like radiocarbon, K/Ar, fission tracks, thermoluminiscence, TH230/U234, paleomagnetic reversals, deep sea core studies, and dendrochronology. For the time period considered in this book, radiocarbon dating is the most appropriate and most widely used method, although deep sea cores, ice cores, and pollen stratigraphy sometimes also provide useful situations. Other methods younger time periods (such as dendrography) or older, i.e., geological, times. Radiocarbon dating has been extensively used in archaeological research and this provides firm anchors to which archaeologists can tie up their discoveries. This by no means implies that in practice archaeologists and prehistorians rely exclusively on absolute dates. On the contrary, absolute dating makes up only one strand of the complex web of concepts of time employed by prehistorians in even the most mundane considerations.

Relative Chronology: The earliest concept of dating was based on the law of superposition, which reasons that the deeper the stratum in the stratigraphic sequence, the older it is. Chronostratigraphy is the oldest dating technique. Geologists realized that sedimentary rocks appeared in a layered sequence, a sequence of strata, recognizable by their texture and/or color. Presumably older rocks are in the bottom layers, and newer rocks in the top ones. This interpretation was made possible by the discovery that simpler fossil organisms were consistently found in deep layers while more complex ones, seen as more recent fossils, were found in more shallow layers. Faunal markers were used, wherever possible, to correlate stratigraphic sequences, but the paucity of unambiguous evidence, information in certain are useful for either compounded by poor preservation of organic materials, rendered this task difficult. Later developments involved somewhat more quantitative (but still relative) dating techniques that utilized chemical changes in the organic remains due to oxidation/ degeneration. Thus techniques such as the fluorine to phosphate ratio and sequential growth of hydration layers on obsidian became applicable in dating. Geological changes are long term and the examination of geological strata imparts us the knowledge of humans and their environments on a similarly long time scale. Such studies are, therefore, useful in the study of humans in the Stone Age.

The same principle is used in determining the relative chronology of the Neolithic settlements. It so happens that man often chose certain habitation points, may they be temporary nomadic camps or fixed settlements, generation after generation, sometimes going back thousands of years in the past. The people of a certain "culture" start living at some location, most probably a spot frequented by

erstwhile band of hunter-gatherers. They keep on building their dwellings at the same spot generation after generations, on top of the ruins of the previous generations. The spot, therefore, keeps on rising and eventually becomes a mound.

Most of the archaeological sites have been discovered at these artificially created mounds, to which the Arabs gave the name of *tell*, the equivalent of the Sindhi *daro*, Pashto's *dheri*, the Baluch *dhamb*, the Punjabi *teela*, or the Iranian *tepe*. In this process, the successive layers of structural remains, as it were, become the leaves of a book of unwritten history. It is through a careful excavation of these mounds and the classification of their contents, layer by layer, that the cultural succession is ascertained. In Pakistan, not all excavations have been done in such a methodical fashion. In fact, little work of this kind has been done outside some main sites that form the backbone of our information. These layers, when excavated under certain archaeological parameters, represent the *relative* chronology of the site in question, and are variously identified as Periods or Phases, each Phase or Period sometimes divided into several sub-Phases and sub-Periods.The time interrelationship of these phases, periods, sub-phases, and sub-periods forms the basis of chronology. The prehistorian studies this chronology in order to locate and describe the path that this particular group of humanity took in their prehistoric journey to civilization, migration, or extinction.

Stratigraphic and typological correlation have been central to estimating the age range of archaeological occurrences in Pakistan. Archaeologists have placed much emphasis on showing the relationship of artifact type variations within stratigraphic columns. Based on changes in artifact types in alluvial stratigraphy, cultural sequences have been identified and the changes in artifact forms, especially the pottery, has been successfully used to compare the age of the find with those

between the given stratifications. Some

of the comparisons are regional, that is between two or three sites in close

found at lower and upper stratum. Temperature,

proximity, to see if the overall similarityrainfall and humidity, the basic parameters of cli

mate, leave behind their historical records in various

of the assemblages indicate the same kind

living and non-living materials. Once these events are detected in chronological order in a sedimentary

of "culture". A convenient example is the

column, it is possible to assign ages to the corre

similarities in painted motifs on potterysponding depths and calculate the deposition rates.

Archaeologists are generally drawn to mak

found in northern Iran, Mundigak near

ing formal comparisons between the artifacts in their archaeological assemblages. These are based

Kandhar, and the Quetta Valley and thus

on similarities among the objects that have been

indicating a common cultural base in thegathered through surface exploration and excava

tion. Some of the comparisons between these as

region. Some of these comparisons are,

semblages are close, as those between various

sites of Amri culture and those designated as theof course, inter-regional, for example

Quetta Culture. Some are less so and there is craft

between Pothowar and Sanghao Cave orto see the forrest beyond the trees due in part to theCultural stratumfact that there are many dimensions on which arti between Kot Diji and Rehman Dheri or

facts can be compared - shape, decoration, mate

even between southern Turkistan andrial, the three primary variables. But, as Possehl

has pointed out (9), shape or form and decoration

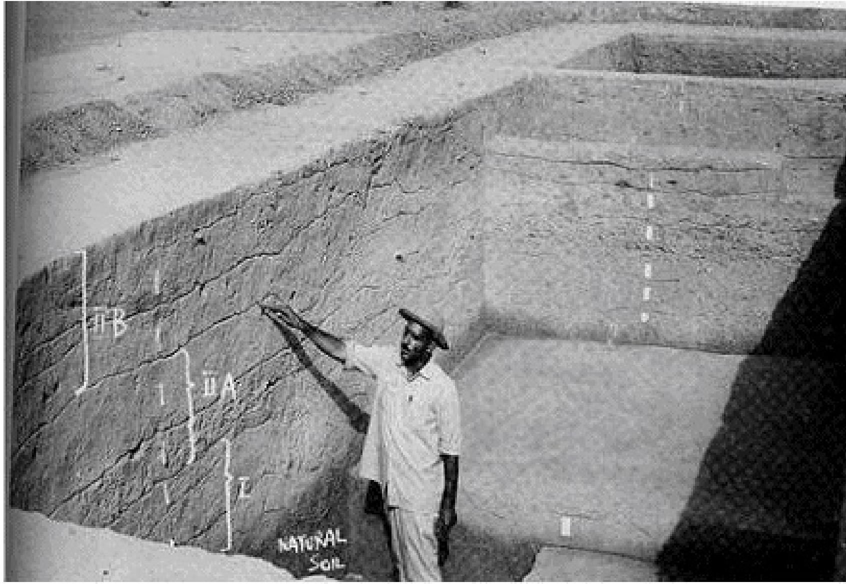
northern Baluchistan. And then, there isare not discontinuous variables. They are arranged

of ri verine silt, of a settlement that was abandoned. Picture was taken in the plains of Indus

an

on multidimensional continua, so the room for vari

important comparison between theability is very high.

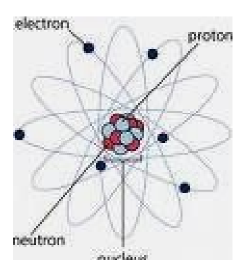


Stratigraphy at Jalilpur; M.R.Mughal providing scale (*Pakistan Department of Archaeology*)

general nature of assemblage of one geographical another. comparison would be that between the Indus Valley and Mesopotamia, between certain sites the Indus Valley and those in Turkistan, or between the Indus Valley and the Gangetic Valley
Stratigraphy at Jalilpour, M.R.Mughal indicating the scale. There are many dimensions on which Stratigraphy and typological correlation have been central artifacts can be compared,to estimating the age range of archaeological assemblages.

There is long standing sense among ar Page 49 chaeologists that the affinity between any set of archaeological assemblages varies directly with the similarities they exhibit in generically related characteristics, e.g., “The more the pots look alike the more closely related the assemblages are” (19). There is a corollary to this that suggests that the degree of relationship can be determined by the ratio of shared versus non-shared traits.

In spite of the fact that there is a good deal of truth in this observation on similarities among assemblages it presents archaeologists with serious problems. Some of these are methodological and some are theoretical. How does one establish similarity and does it always remain the same thing? What are the dependent and independent

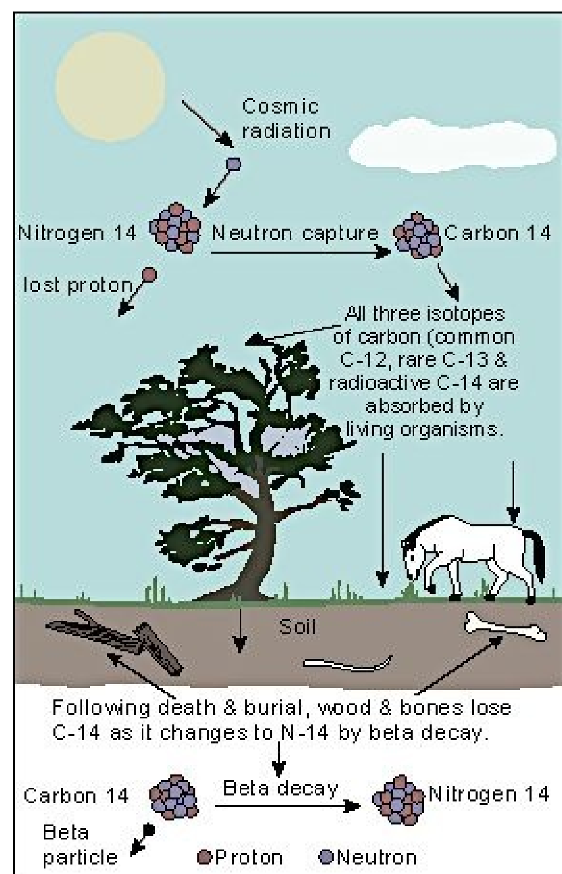


variables in the analysis of artifacts? The methods reduces the culture concept to a series of traits that is difficult to assemble into the integrated, or systemic structure that best characterize culture (9). Other inadequacies are simply bad practice. Most of all, at least in our case, is the ideological content of the analysis which propels some of the archaeologists to reach conclusions that further their ideological cause. One such example is the headlong effort of some ‘nationalist‘ scholars of India who are relentlessly trying to drag the Indus Civilization and its precursors ever closer to Indian borders, even deep inside India on the basis of some questionable comparisons of artifacts without any regard to the timeframe.

Absolute Chronology: Although early archaeological and geological research recognized the importance of stratigraphy in establishing relative chronology, absolute chronology remained a daunting task for reconstructing cultural evolution in time and space. Some archaeologists prefer the terms *chronometric* or *calendar dating*,, as use of the word "absolute" implies a certainty and precision that is rarely possible in archaeology. Absolute dating is usually based on the physical or chemical properties of the materials of artifacts, buildings, or other items that have been modified by humans. Absolute dates do not necessarily tell us when a particular cultural event happened, but when taken as part of the overall archaeological record they are invaluable in constructing a more specific sequence of events. Archaeologists often provide chronometric dates in BP, that is, before the present, using 1950 as the base year for scientific convenience. An object dated 350 BP would be 400 years old in AD 2000 (1950 + 50). Prehistorians often use the term ‘ years ago’, for describing events or phenomena of some antiquity. For example, a time period of around 3000 BC would be described as “five thousand years ago”. For more recent events, they generally use the term ‘BC’ or ‘BCE’.

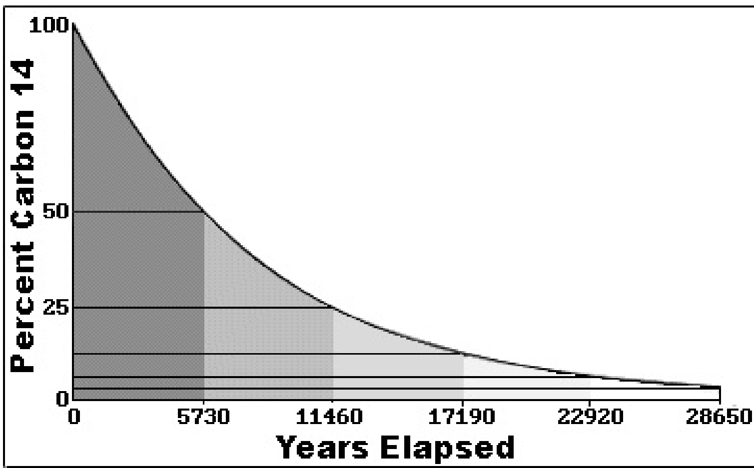
Several chemical and physical dating methods have been used in the past. All these methods are based on the measurement of a parameter that evolves with time in a continuous and predictable manner. This could be the radioactive decay of a radioactive isotope whose decay rates are known. Although Rutherford first conceived the idea of the applicability of natural radioactivity for dating as early as 1905, it was Libby who laid the firm ofundation of radiometric chronology in the late 1940s. Ever since, numerous archaeological samples have been dated.

Radiocarbon Method of Dating: Radiocarbon dating is perhaps the most frequently used method in archaeology. The useful time range of the method is about 40,000 years, and this makes it an extremely useful tool in chronological investigation of the time period (10,000-3,000 BC) covered in this volume. The principle involved in carbon dating is rather simple: Chemical elements are characterized by the number of protons and neutrons in their nucleus. In addition, practically all elements exist in the form of isotopes, nuclei containing the same number of protons, but containing a variable number of neutrons. For example, the most abundant isotope of carbon contains six neutrons, but a rare carbon isotope contains eight. To distinguish different isotopes of the same elements, one adds up the numbers of protons and neutrons and writes, for example, C-12 for the most common carbon isotope and C-14 for the rare isotope.



C-14 cycle in nature

The figure below illustrates the basic mechanism through which C-14 is produced, is absorbed by living things, and disintegrates into N-14. Cosmic rays produce C-14 isotope of carbon through the nuclear interaction with atmospheric nitrogen, another element in nature. The C-14 combines with oxygen to form radioactive carbon dioxide, which then enters the biosphere (and the food chain) and hydrosphere through photosynthesis and as dissolved carbonates respectively. Owing to the equilibrium between production and decay, the C14 concentration in the atmosphere remains constant with a ratio of C-14/C-12 being 10^{-12}. 'Death', i.e. on removal of the organism from this cycle, leads to a termination of the supply of C-14. The C-14 present in the sample then starts depleting by its radioactive decay, with its characteristic half-life of 5,730 years. With the passage of time, the C-14 content of the samples continually keeps decreasing until the measurement limit is reached. The basic laws of radioactive decay permit calculation of the time that is needed to reduce the C-14 activity of a sample from its equilibrium value to the observed presentday value. Carbon comes, one way or the other, from living organisms, such a plants, insects, fish, and animals. The amount of carbon-14 radioactivity present in a sample tells us how old it is or, rather, at what time in the past the organism lived. Thus, if we can find a carbon compound of some sort in a stratum, there is good chance that we can determine its age.



Exponential Pattern of radioactive decay

The measurement involves preparation of the sample by combustion in a pure oxygen atmosphere, preparation of pure carbon dioxide, its reduction into benzene or methane, chemical purification of these (either methane or benzene), and finally the measurement of their specific activity by the coincidence nuclear gas counting or the scintillation counting techniques. A heavy lead-shield houses the equipment to reduce the interference from signals produced by radioactivity within the laboratory walls. About two decades ago, a significant step forward in the technology was achieved by the concept of atom counting which provided exceptional improvement in the detection levels. The basic difference of this method is that instead of counting the relatively few decaying atoms, one determines the total number of C-14 atoms directly with a sophisticated accelerator with mass separation capabilities. This significantly improves the detection efficiency, thereby enabling very small (sub-milligram) samples to be counted with equal or higher precision.

Calibration, Accuracy and Reliability*:* Archaeologists have learnt that constructing a radiocarbon chronology is neither simple nor straightforward. The simplicity of the the method is diluted in a real-life situation on account of several factors. These include mainly the variation in C-14 production through time, isotopic fractionation effects, and reservoir ages. It was soon realized Th.at the initial assumption of a constant C-14 concentration through time was not valid, due to changes in cosmic ray fluxes on account of the variable geomagnetic field and solar activity. A way out of this was to *calibrate* the C-14 ages to calendar ages by analyzing annual tree-rings from bristle cone pines and oak trees. Standard calibrations for up to the past 1,000 years are now av.ailable and they provide the most recent calibration curve which allows conversion of C-14 ages to calendar ages. More recently, annually carved lake sediments have been used to extend the calibration range to 15,000 years. Beyond that, some effort has been made to use corals, dated precisely by uranium series isotopes. These studies suggest that a C-14 age of 18,000 years corresponds to a calendar age of approximately 21,500 years i.e. a difference of about 15 per cent. Calibration of even higher C14 ages is not yet possible, and thus the ages are provided in C-14 years only.

The calibration of radiocarbon dates is essential, since it has been known from the early 1970s that the "calendar" of radiocarbon dates is not the same as the "calendar" for the progression of the earth around the sun. The reason for this is not completely understood, but it seems to be related to different amounts of C-14 in the atmosphere. Why the aggregate of C-14 changes is open to debate; but there are now very good curves and tables available for the calibration of dates that turn radiocarbon years into a very good estimate of calendrical years. They are the result of controlled dating of thousands of wood samples of known ages that come from long lived trees like the sequoia, or the bristlecone pine. These samples are first dated by counting the annular tree rings to establish

the precise age of the wood. The wood is then run through the radiocarbon dating process. By statistically treating the large number of dates derived from this method, a reliable curve documenting the deviation between true "tree ring" dates and the C14 date is arrived at.

Anomalous dates occur at most sites, sometimes in abundance, as at Mehrgarh. Some important sites, like Anjira, Kulli and Chanhgu-daro, do not have radiocarbon dates, which means that comparative methods have to be used to estimate their ages. Single radiocarbon determinations for a phase or strata cannot be relied on. A dependable laboratory can make an accurate determination of the point in time when the organism from which the sample has been taken stopped exchanging C-14 with the outside environment. This moment is usually thought of as death. But, a host of uncontrolled variables comes into play that compromises this simple equation. For example, a wood is often reused, sometimes for several generations, especially in an arid environment. It is also known that wood from the center rings of a large, very old tree will be dated to an earlier era than the wood from the younger, outer rings of the same tree. Ancient peoples frequently dug in their habitation areas, creating wells, foundation trenches, storage facilities and trash pits which disturbed and redistributed older archaeological strata, and the charcoal in them. This sometimes brought older carbon into association with younger artifacts.

Although a broad outline on the absolute time scale is comfortably valid, the chronology of ancient Pakistan remains nothing more than a broad outline. There is room for improvement of our dating all through the sequence and this inevitably means that there is room for disagreement among authorities in the field. There is more agreement on the relative stratigraphy, but even here there is margin for debate on particular issues. For example, the relationship between the Hakra Wares Phase and the Early Indus is not well documented, with only Jalilpur providing a hint of the relative stratigraphy.

These uncertainties should not fool anyone into believing that there is a precision to the dating techniques. It also highlights the real need for further work. In some ways, this is routine archaeological research, but it is also fundamental to furthering an understanding of South Asia's earliest farmers and herders. Dating debates often concern the technical aspects (e.g. laboratory procedures) of the chronological work carried out. Arguments range over the 'reliability' of a certain dating method and the chronological resolution obtained. Problems with chronological dating in general as well as particular dating techniques have been discussed extensively by several authors but much less focus is on the field context of the dated materials, which is at least as important. While quoted standard deviations give some measure of the accuracy of the laboratory procedure to which the dated sample(s) has (have) been subjected, a small standard deviation does not necessarily indicate that the date(s) obtained is (are) very accurate with regard to the research question (the age of a fossil or artifact assemblage). hiatuses or squeeze a large time-period into a small sedimentary unit or horizon, combining 'old' dates with much younger archaeological materials into one stratigraphic horizon or two closely associated stratigraphic horizons. Dates obtained by dating horizons situated 'just below' archaeological horizons are always suspect in this aspect.

Equally important is the context of the artifacts or carbon-bearing remains to which a date is to be attached. A well-established, unambiguous *in situ* provenance is a fundamental requirement. The taphonomic history of a fossil or artifact assemblage context of chronological evidence. A particular issue to be raised in the context of dating debates is the question how warranted the reliability attached to a certain dating method is. Almost all dating methods, be they 'absolute' physical dating methods or

'relative' methods like biostratigraphy, have their own

Reworking of the formation materials, sedimentary

of lag deposits can particular problems that can be a source of error. In that sense, dating deposits can only be reliably done if several different dating methods are used to crosscheck each other.

Application in the Subcontinent: Most of the chronological work that has been undertaken in Pakistan is in context with the Harppan Civilization. Firm dates for the events and processes of cultural change prior to this period are few: even these are based on comparative analyses and indirect inferences. Some carbon dates are, nevertheless, at hand and their availability is slowly increasing. As far as the early Neolithic is concerned, say 10,000 years ago, few reliable dates are available and the chronology of the time period between the onset of the Holocene and the Harappan urban phase is rather patchy. In view of the above situation, one must think about the history of ancient cultures in Pakistan and the surrounding areas in terms of anthropology. This has been done by Possehl (9) in his schema for the Indus Age.

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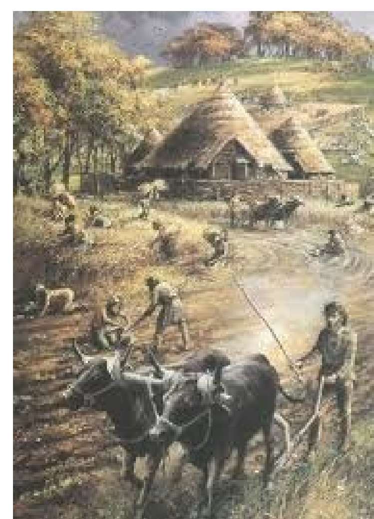
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SECTION II
NEOLITHIC REVOLUTION

#

II.0. The Neolithic Revolution



Toward the end of the last Ice Age, some 12,000 to 15,000 to years ago, a few of the communities that were most favored by geography and climate began to make the transition from the long period of Paleolithic to a more settled way of life depending on

agriculture and animal husbandry. This period is sometimes referred to as the Neolithic Revolution because the technological innovation were momentous and human social and political organization underwent an extraordinary increase in complexity. This term was coined in the 1920s by V. Gordon Childe to describe these radical changes at the turn of the Pleistocene epoch and the beginning of the Holocene. During this transition the small and mobile groups of hunter-gatherers, which had hitherto dominated the scene, would be transformed into sedentary societies based in builtup villages and small towns.This human trait, probably originating in the southern borders of the western half of Eurasia, if not developed simultaneously, spread to the whole area which Possehl (1) calls ‘Middle Asia’, a large geographic area that spanned between the eastern shores of the Mediterranean to the banks of the Indus River, from the slopes of the Zagros mountain range to the northwestern edges of the Iranian Plateau.The rise of Neolithic culture was unquestionably one of the most important events in human history. Agriculture, or food production, as archaeologists call it, appeared during this time in many different regions of the world.

In this Section we survey the profound global transformation that followed the end of the Pleistocene at around 12,000-15,000 years ago and Pakistan’s place in this transition. This transformation had two components. The first was environmental change, notably the warming of the global climate, causing the ice to melt and a consequent rise in sea level, and the expansion of plant and animal species. The second was the human response to new opportunities provided by the warmer and wetter climate, which got translated into the development and spread of sedentary life, arts and craft, pottery, and above all, agriculture. A large part of this volume is concerned with the exposition of these cultural and technological changes in Pakistan; this Section provides an overview to serve as a primer for what to come.
We examine this important segment of

Pakistan’s prehistory in relation to the cultural dechange on a larger scale. It is a global approach and therefore other areas of the Old World will be freely brought under discussion. It is also the broad ecological approach foreshadowed in the preceding Section and further developed through the body of this volume. This Section allows us to see the need to explore with greater effect the essential

continuity of prehistory instead of segmenting it into concrete segments of particular 'cultures'. It also provides us with the opportunity to look at the cultural, economic, and technological developments in Pakistan in relation to similar changes worldwide.

This defining stage began about 10,000 years ago, when hunter-gatherers in the Near East, Central Asia, Afghanistan, and Baluchistan broke from the long human tradition of intensely mobile foraging and turned to more settled ways of life built around cultivating cereal grains or tending animals. The domestication of plants and animals led to the establishment of farming economies that could support much larger communities. The result was a growth in world population to much higher levels than were sustainable by hunting and gathering alone. In Pakistan, this is reflected in the vast increase in the number of agricultural villages beyond 7,000 BC.

Although the beginning of food production is the most significant factor defining this segment of human history, the Neolithic Revolution involved far more than the adoption of a limited set of foodproducing techniques. During the next millennia it would transform the small and mobile groups of hunter-gatherers that had hitherto dominated human history, into sedentary societies based in builtup villages and towns, which radically modified their natural environment by means of specialized foodcrop cultivation (e.g., irrigation and food storage technologies) that allowed the production of 'surplus'. The surplus thus produced, in turn, allowed some people to devote a part of their time for perusing activities that were not directly related to food production. This development provided the basis for specialized and complex labor diversification, trading economies, the development of art and architecture, some sort of centralized administrations and political structures, hierarchical ideologies and depersonalized systems of knowledge.

The relationship of the Neolithic characteristics to the onset of agriculture, their sequence of emergence and empirical relation to each other at various Neolithic sites remains the subject of academic debate, and seems to vary from place to place rather than being the outcome of universal laws of technical and social evolution. In this Section, we review these differences and similarities and try to formulate a global synthesis that could be used to understand this vital period in Pakistan's history. The narration presented here reviews the geographical patterns in the emergence of agricultural economies in the Old World, and outlines the basic tenants of the Neolithic cultural stage. Of course, as we look around in the neighborhood for evidence, our focus still remains on the Greater Indus Valley.

The beginnings of farming, with people being as dependent on the cultivation of land as on the herding of stock, is an integral part of the Neolithic Revolution. It is a vast subject in its own right; we shall deal with it in the next Section in some more details. Here we shall concentrate on other aspects of the Neolithic.

II.1. The Neolithic Revolution



The Neolithic Revolution, sometimes also called the Agricultural Revolution, was the world's first historically verifiable cultural and technological revolution in human history. It was the wide-scale transition from a lifestyle of hunting and gathering to one

of agriculture and settled life. Archaeological data indicates that the domestication of certain plants and animals evolved in various locations worldwide, starting in the Holocene around 12,000 years ago. However, the Neolithic Revolution involved far more than the adoption of a limited set of food-producing techniques. During the next millennia it would transform the small and mobile groups of hunter-gatherers that had hitherto dominated human history into sedentary societies based in built-up villages and towns, which radically modified their natural environment by means of specialized food-crop cultivation (e.g.,irrigation and food storage technologies) that allowed extensive surplus food production. These developments provided the basis for densely populated settlements, specialized and complex labor diversification, trading economics, art, and culture, political structures, hierarchical ideologies, and depersonalized systems of knowledge. The first fullblown manifestation of the entire Neolithic complex is seen in the Middle East, Central Asia, and Baluchistan. The relationship of the onset of agriculture to these Neolithic characteristics, their sequence of emergence and empirical relation to each other at various Neolithic sites remains the subject of academic debate, and some of this literature will be under review in this chapter.

Like the Paleolithic and the Epi-paliolithic, the Neolithic period was initially defined in terms of the stone tools that human used and left behind. Contrary to the Paleolithic and the Epi-paleolithic, These days, however, we do not discuss the Neolithic in terms of the stone artifacts tools; instead the Neolithic is increasingly being treated in terms of human culture, social organization, economy of food production and consumption, and the way of living and coping under varied environments. This is possible to do so because archaeology now finds much more than the stone tools. The focus is more on economy than on technology although technothe development of architecture,

centralized administration and logical aspects still remain important. The Neolithic, like the Paleolithic, is not specific to any one specific region like the Levant or the Greater Indus Valley: it is a universal transition from a state of hunting-gathering to a sedentary life of food production; only its timings differ from region to region. Consequently, the impact of this profound change in human condition can only be realized if approached on a global scale. Most of the research into the Neolithic has been done in the Near East and, consequently, this area provides us with the greatest details.

It was Gordon Childe who highlighted the true socio-economic significance of Neolithic cultures by associating them with the emergence of the practice of plant cultivation and animal domestication and a settled village life in the Near East. In his analysis, food production, in contrast with food collection, was considered to be the hallmark of the Neolithic. Since domestication of plants and animals necessitated a sedentary habitation, settled communities began to be another hallmark of this age. Of course, the technology of tool making improved but the role of technology was subservient to the mode of food production and distribution.

Whilearchaeologists still accept his general characterization of the Neolithic Revolution, we've learned a lot more in the decades since Childe's original study. We now recognize that sedentary living actually *preceded* farming in certain locations where permanent settlements were sustained solely by gathering and hunting or fishing, not by agriculture. For instance, we noted in the last Section that the Natufian hunter-gatherers of the Levant, among others, established sizable villages. Thus, sedentism often stimulated food production, rather than the other way around. Archaeologists also now know that Neolithic way of living evolved independently in several places around the world, not necessarily in



In so many ways Neolithic represents a decisive step toward civilization

the Near East. These researchers see most regional Neolithic developments as the culmination of local cultural sequences, although some still argue for migrations and the diffusion of agriculture from the Near Eastern "heartland" or “nuclear zone” in which such cultural changes ostensibly first took place.

The shift from earlier hunting and gathering society to food-producing farming communities is now viewed in the context of several factors including the change in climate which became more conducive to plant growth with the onset of the Holocene. As a result, new paradigms have been

added to the hypothesis. For instance, Robert Braidwoods, the eminent archaeologist whose work and thought shaped a generation of research on the problem of plant and animal domestication in the Near East, refined Childe's nascent ideas and placed the most important locus of change not on the subsistence system *per se*, but on the evolution of what he called the "primary village Farming Community" (3).

Characteristic Features: Two phenomena characterize the early stage of the Neolithic: a gradual evolution into developed village life, and a gradual importance of food production in the subsistence regime. Village communities of as many as 250 to 500 or more individuals were common enough, and with lesser and lesser dependence upon hunting as a secondary economic resource. We can recognize the growth of a full-fledged sedentary society, less self-contained than the earlier rudimentary settlements and camps of the Epipaleolithic (or, Mesolithic) times. This means simply that an increasing number of specialists became necessary to handle effectively the administration of a society whose families lived together the year round and whose collective effort in the cultivation of crops and the herding of food animals provided a total production which exceeded the individual subsistence requirement for that year - in other words, a society with a surplus which could be used for the acquisition by barter, or by some other systems of exchange, of things not found locally or, more importantly, which could be used to pay for the services of someone whose yearly duties did not require work in the field.

With the development of agriculture, humans began to radically transform the environments in which they lived. A growing portion of humans became sedentary cultivators who cleared the land around their settlements and controlled the plants that grew and the animals that grazed on it. The greater presence of humans is apparent, as stated above, in the steadily growing size and numbers of settlements. These were found both in areas that they had long inhabited and in new regions that farming allowed them to settle. This great increase in the number of sedentary farmers is primarily responsible for the leap in human population during the Neolithic transition. For tens of thousands of years before agriculture was developed, the total number of humans had fluctuated between an estimated five and eight million persons. By 4000 B.C., after four or five millennia of farming, their number had risen to 60 or 70 millions. Villages and cultivated fields became the dominant features of human habitation over much of the globe.

There also developed certain religious beliefs and practices as is evident from the planned burials at a number of sites belonging to the period. The presence of beads and ornaments of sea-shell and colored stones suggest that these products or the raw materials for them were brought from their source areas far away in distance. It indicates the existence of some sort of rudimentary exchange system and long-distance contacts.

Though the subsistence increasingly depended on cultivated plants and domesticated animals, agriculture was far from the dominant mode of support for early Neolithic societies. Archeological evidence suggests that the first agriculturists retained their hunting-and-gathering activities as a hedge against the ever-present threat of starvation. But as hunter-gatherers became more adept at cultivating a growing range of crops, including proteinrich legumes such as peas and beans, various fruits, and olives, the subsistence effort they expended on activities outside agriculture diminished.

Domesticated animals such as cattle and sheep provided the Neolithic man with additional sources of protein-rich meat and in some cases milk. Animal hides and wool greatly expanded the materials

from which clothes, containers, shelters, and perhaps crude boats could be crafted. Animal horns and bones could be carved or used for needles and other implements. Because plows and wheels did not come into use until the Bronze Age (*ca.* 3000-25000 B.C.), most Neolithic peoples made little use of animal power for farming, transportation, or travel. There is evidence, however, that people in northern areas used tamed reindeer to pull sledges, and those farther South used camels for transporting goods.

Several animals were domesticated along with plants and the two processes combined to form the base for the critical transformation in human culture under discussion. Different animal species were tamed in different ways that reflected both their own natures and the ways in which they interacted with humans. Dogs, for example, were originally wolves that scavenged at human campsites. As early as 12,000 B.C., the Stone Age peoples found that wolf pups could be tamed and trained to track and corner game. The strains of dogs that gradually developed proved adept at controlling herd animals like sheep. Relatively docile and defenseless herds of sheep could be controlled once their leaders had been captured and tamed. Sheep, goats, and pigs (which also were scavengers at human campsites) were first domesticated in the Near East between 8500 and 7000 B.C. and about the same time (or even earlier) in northern Afghanistan and Baluchistan. Horned cattle, which were faster and better able to defend themselves than wild sheep, were not tamed until about 6500 B.C. The central place of bull and cattle symbolism in the sacrificial and fertility cults of many early peoples has led some archeologists to argue that their domestication was originally motivated by religious sentiments rather than a desire for new sources of food and clothing.

In summary, the term Neolithic is presently used, especially in archaeology and anthropology, to designate a stage of cultural evolution or technological development characterized by the use of polished stone tools, the existence of settled villages largely dependent on domesticated plants and animals, and the presence of such crafts as pottery and weaving. The time period and cultural content indicated by the term varies with the geographic location of the culture considered and with the particular criteria used by the individual scientist. For example, the Neolithic is placed around the eighth millennium BC in the Near East, seventh millennium BC in the Indus Valley, especially in the Kachi plain, fourth millennium BC in Europe, and as world also and the model began to be applied universally. Identification of one trait led to the presumption that the others would also be present, or would soon emerge, generating a circular argument bound to ensure the simultaneous appearance of all four or five traits. However, closer examination of both the European Neolithic and the Near East suggested that the package deal was less than convincing even in those areas, and evidence emerging from other regions around the world was presenting an even greater challenge to the package model.

The archaeological facts that have since emerged indicate that not all of the cultural elements characteristic of the Neolithic appeared everywhere in the same order: the earliest farming societies in the Near East did not use pottery, and, in Europe, it remains unclear to what extent plants were domesticated in the earliest Neolithic, or even whether permanently settled communities existed. In other parts of the world, such as Africa, and Southeast Asia, independent domestication events

late as the second millennium
BC in South India. Even within
Pakistan and its immediate sur
roundings, the so-called ‘North
ern Neolithic’ is dated around

the third millennium BC and the areas on the western edges of the Thar Desert in Sindh the second millennium BC. The termination of the Neolithic pe riod is marked by such innova tions as the rise of urban civili zation or the introduction of metal tools or writing. Again, the criteria vary with each case and so does the chronological framework. In the case of Paki



stan we take 2,500 BC as the terminal date when the urban phase of Greater Indus Valley nominally comes into full bloom in the form of the Harappan Civilization. As an aid to historiography of Pakistan, we consider the period between 7000 BC and 4000 BC as the ‘Neolithic’, 4000 BC to 2500 as ‘Chalcolithic‘ and 2500 BC to 1,000 BC as ‘Bronze Age’ in Pakistan, followed by the ‘Iron Age‘ beyond that point.

Not a Package Deal: It may appear from the above that the Neolithic culture was a universal culture or a package of cultural traits that somehow permeated the whole known world at certain point in time in human history. The idea that the emergence of agriculture, sedentism, pottery and social complexity took place as a package deal, a *revolution* - described so eloquently by Childe - was in a

general sense probably true of the European evidence available fifty years ago, and initially evidenced from the Near East. Given the Eurocentric focus of Neolithic archaeology, it is hardly surprising that the package deal model became a matter of assumption rather than investigation for other parts of the led to their own regionallydistinctive Neolithic cultures that arose completely independent of those in Europe and Southwest Asia. Early Japanese societies used pottery *before* developing agriculture.

Although prehistorians, by and large, agree that new subsistence economy based on farming and stock-raising was a turning point in the development of human civilization, they nevertheless disapprove the use of the term 'Revolution.' According to them, the term 'Revolution' conveys the idea of some sudden or abrupt change whereas

the transition to Neolithic life everywhere was a part of a long drawn process, the beginnings of which could be noticed in the earlier Paleolithic and the Epi-paleolithic phases. Childe had initially put forward his idea of a ‘revolution’ in the book, *New Light on Most Ancient* (4) but later in *The Prehistory of European Society* (5), while he retained the term "Neolithic Revolution," he conceded that it did not imply a single catastrophic change and that this change was "the culmination of a gradual progress, begun centuries earlier." It is now generally agreed that progress in Neolithic period may be treated more as a "transformation" or "evolution" rather than a "revolution."

As a result of these developments, the Neolithic has now become an accepted characterization for a gradual transition from food collecting to food production, an increase in population, an increase in labor specialization, an increase in longevity of life, the beginnings of settled communities in small villages, and a preparation for the development of mature village farming communities. All these things happened but they did not happen suddenly and simultaneously, as the term “revolution” would imply. Methods of collecting food by hunting and fishing were replaced by animal husbandry gradually and gathering plants’ seed and fruits were replaced by agriculture slowly. Similarly, the nomadic movements were replaced by living at fixed settlements through an equally long-drawn process.

Furthermore, it was realized that all these processes passed through quite a few gradations of each. For example, hunters may have domesticated a few animals even as pets, nomads may have turned into nomadic pastoralists involving semipermanent campsites which they visited year after years. Pastoralists may have engaged in some very early stages of plant domestication, agriculturists may have been heavily involved in animal husbandry, and so on. Settlements may have existed without agriculture and domestication of animals, especially around lakes and on the banks of small rivers as well as on the coast. Conversely, agriculture and animal domestication may have been practiced without permanent settlements, using temporary but repeatedly used campsites. These intermediary developments are difficult to find or even to define. Some scholars would put these stages in the catchall category of the Mesolithic, as has been done in the previous Section of this book. Some would categorize them as the early Neolithic. Even here, the process must be viewed as a continuum, with ever-changing gradations.

Near Eastern Connection: The earliest known evidence for the Neolithic developments is from Southwest Asia (the Near East) between 10,000 B.C. and 6000 B.C. There the domestication of plants and animals was probably begun by the Epi-paleolithic Natufian peoples, leading to the establishment of settled villages based on the cultivation of cereals, including wheat, barley, and pulses, and the

raising of cattle, sheep, goats, and pigs a couple of millennia later. This region has been extensively researched during the past half a century and the archaeological data have provided an outline of the steps ancient man took in his evolution from intensive food gathering to full-fledged food production. The record is remarkable in its relative completeness, even though there are numerous gaps and limited factual evidence. This research, therefore, comes handy in our case by drawing parallels with ancient Pakistan where the research in


A Persian manuscript, explaining the cultivation of plants.

the primary-village stage is rather cursory and the relevant data quite scanty.

Archaeological remains in the Near East point to the evidence that by 12,000 BC, or a couple of millennia earlier, humans were beginning to congregate around some choice regional locations which gradually developed into seasonal foraging camps or fixed settlements for year-round residence. Along with the sedentary way of life came the domestication of plants and animals, and eventually the growth of agriculture and pastoralism. By 8,000 BC food production rather than food collecting, became the hallmark of this new life style. Whether sedentism was the cause and the plants and animals domestication the result, or vice versa is not the point of discussion here. What is important is to note that the emergence of agriculture and animal herding proved to be as important as sedentism in the post-Pleistocene environment. These two things set the man on the course of civilization, a process that continued with much accelerated rate. These changes were of such a magnitude that archaeologists working in the Near East had little hesitation in describing the transition to sedentism and agriculture as a “revolution”, comparable to the one that defines the beginning of the Upper Paleolithic 50,000 years ago when behaviorally modern humans emerged from their anatomically modern forebears. Ofer

Bar-Yosef refers to these transitions as "two major revolutions in the history of humankind" (6). Early Neolithic farming in the Near East

was limited to a narrow range of plants, both wild and domesticated, which included einkorn wheat, millet and spelt, and the keeping of dogs, sheep and goats. By about 8000 BC, it included domesticated cattle and pigs, and the use of pottery.

The Neolithic culture spread quite rapidly in the surrounding areas of Anatolia, Syria, and northern Mesopotamia. At Çatalhöyük in Anatolia, houses were plastered and painted with elaborate scenes of humans and animals. Elaborate tombs were built for the dead. Soon, the western part of Iran was enjoying the fruits of these developments. According to the conventional wisdom, by 7000 BC these cultural traits spread to northern Iran, and by 6000 BC to southern Turkmenistan and Baluchistan. By 4,000 BC Neolithic culture was spreading through Europe. Eventually most of the Old World

populations were transformed from mobile huntergatherer groups to settled farming societies combin! A Prelude to Civilization

ing the local cultural developments with innovations presumably diffused from the ‘nuclear zones’.

Fordecadesarchaeologistshavebeen Early Settlements**!** searching for the origins of agriculture and, as described above, their findings indicated that early points out: “For many years, sedentism was thought the corn/bean/squash regions of the Americas, or the western parts of Pakistan,
plant domestication took place in the western and to be incompatible with a foraging lifeway except in makes good sense but presents a problem that has not been addressed

northern Fertile Crescent. Later research, however, a few favored locations, North America’s Northwest adequately. The modern distribution of these wild ancestors cannot necessarily
demonstrated that the foothills of the Zagros MounCoast being the classic example. However, it is now
reflect the distribution of the same species in the early Holocene. In large part,
tains of Iran in the eastern Fertile Crescent, South clear from archaeological and ethnohistoric data
ern part of Timken, and Baluchistan also served as that significant reductions in residential mobility ocdue to the density of research in the Middle East, archaeologists are beginning to
key centers for early domestication. We shall elabocurred without benefit of agriculture (or with agricul come to grips with the problem there, but it has been a major research effort,
rate on it as we proceed in the next Section. ture playing only a minor role) in a number of areas, involving a massive amount of work. In the case of Pakistan, and for that mater
Sedentism and Agriculture: Sedentism, including the Gulf Coast of Florida, the Levant, the that of the neighboring Afghanistan in the west and India in the east, such an
the business of settling down and maintaining sigAmerican Midwest and perhaps coastal highland organized research effort has never been done. It is only in very recent years that
nificant habitations at one location for many months Peru” (9). Even in 1992 Kelly could point to an ex

or years, has been consistently identified as a criti panding number of North American exceptions toa picture has started to emerge in which ancient Pakistan seems to play a role of
cal change in the behavior of many societies in the the rule, and it was becoming apparent that the Le a major “nucleus” for the propagation of agriculture and domestication at par
culture was not a necessary prerequisite for sedentary life, nor were sedentary settlers always farmers" (8).

Kelly, in his seminal review paper (9),
late Pleistocene and vant did not fit the package either. Even Europe has
early Holocene. In with the Middle East. In fact, it appears that its exception in southern Scandinavia. But, since



Pakistan's role in most of these regions diffusing agriculture and 1992, many other regions including North Africa, this change coincidedpastoralism to its west and northwest on one hand China, Southeast Asia, Japan and the Pacific have with the domesticationand to its east on the other may be more significantproduced further convincing evidence that sedenof plants and animals than believed so far. The indigenous domestication tism in various forms emerged independently of

and the beginning of agriculture (10). It is now apparent that the adoptionof barley has more or less been proven here but there

agriculture. Accordof sedentism among non-agricultural groups was aare still some questions for the local domestication

ingly, sedentism is global phenomenon, not restricted to the wellof wheat. Similarly, there does not seem a doubt to

the criteria of the Neothe indigenous domestication of sheep and goat butlithic Revolution.questions still remain in the case of water buffalo.There has been much

The indigenous origin of humped cattle is evident

debate, however,

about whether sedenbecause this animal was not present in the wild beyond Baluchistan.was the

Several large seed bearing cause or consequence

grasses were spread over a

Botanical surveys in the 20th century have indicated that wild wheat might not

of early agriculture.

large area of Eurasia, includ

have quite as wide a distribution as barley. Paleobotanists have yet to find

Settled life and agri

culture started to

ing Baluchistan and theevidence for wild wheat in Baluchistan or Afghanistan. Wild barley, however, is **Pashtun country in Pakistan.** spread through South

Some of them, such as barley present. One might legitimately wonder if the modern distribution of wild wheat **and wheat, were domesti**

cated and they then became

staple for the Neolithic peo

staple for the Neolithic peo

10,000 years ago, a informs us about the distribution of this plant at the end of the last glacial period.
date that marks the There are some confusing bits of data that suggest that the whole story of this
distribution may not be known, even in the Middle East.beginning of the Neo **ple of the region.** lithic age. Because the
If wild wheat was not present in the Indo-Iranian or Pak-Afghan borderlands,
two inventions became
this region could still have played a key role in the domestication process. The
so visible in the Neo
lithic, archaeologists long assumed that the improvgenetic history of free threshing wheats, those most useful to humans, involves ing climate made agriculture possible, which in turn
genetic crosses with the genome *Triticum* and with a related plant, goat-face
opened the gateway to settled living. But in part
plant, found all across the Iranian plateau, including its eastern parts, namely
because of improved dating techniques, they have

come to see that the reverse is generally true: it was not agriculture that led to settlement, but rather sedentary life came first, well before the Neolithic Page 149 period began, and agriculture followed in its train.

"Until recently, the beginning of the Neolithic was thought to occur with the inception of village farming," write the archaeologists Peter Akkerman and Glenn Schwartz: "We are now aware, however, that sedentary village life began several millennia before the end of the late glacial period, and the full scale adoption of agriculture and stock rearing occurred much later, in the late ninth and eighth millennia BC. It is now evident that agri


Neolithic grindstone, Al Beidha Neolithic Village, Jordan, the Middle East

known European and North American examples cited by Kelly. However, the intensely regionspecific nature of most archaeological investigation and publication has masked just how dramatic this change in our understanding of sedentism really is.

Sedentism is now widely seen as an essential precursor to the earliest agriculture in the Fertile Crescent of Southwest Asia. During the last 30-35 years archaeological research has shown that the earliest sedentism started before one began with on-site agriculture and cattle breeding, and most researchers now believe that sedentism was a prerequisite for the first agriculture to occur. Three perspectives support this view: first, there is extensive archaeological and bioarchaeological evidence for year-round occupation of many settlements in the Epi-paleolithic period in the form of solidly built architecture, abundant immovable goods, such as ground stone, and evidence from bones, seeds and mollusks, of harvesting of food resources at different times of the year. The second perspective is based on ethnographic evidence that links sedentism to increasing population size. As many explanations for the development of food production invoke increased population density during the Epipaleolithic, there is a natural tendency to seek evidence for sedentism during this period. Third, commonsense suggests that once hunter-gatherers started any form of cultivation of wild plants, the demands of cultivation and of crop storage would favor sedentism.

The priority of sedentism over agriculture is, however, not universal and sedentism could be both 'cause' and 'consequence' of farming, and neither. There are many instances of foraging societies becoming more sedentary, and of foraging societies becoming less sedentary, in either case without developing any involvement with agriculture; and there are examples of similar trajectories 'into' and 'out of' sedentism that coincided with an involvement with plant and/or animal husbandry. Many early agricultural societies in fact combined foraging and herding, or foraging and small-scale horticulture, or mixtures of all three, and were mobile, in some cases much more so than when they had been 'pure' foragers.

The notion that sedentism is, if not concurrent with, a necessary precursor to agriculture, a preliminary stage in the line of progression leading to agriculture, is an insidious hangover from Morgan and nineteenth-century evolutionary theory more generally – and it is proving difficult to dislodge (10). Even recent textbooks continue to present agriculture, and by implication the other components of the package deal, difficult to reverse or leading almost inevitably, to agricultural intensification. In this formulation sedentism is somehow a trap which ‘once entered, cannot be escaped’ (10). We shall revert to this debate in Chapter IV.3.

Sedentism, both without agriculture and with this economy, usually meant more people, sturdier houses, new stone tools, more jewelry, burials or cemeteries, more long-distance goods and also clear signs of stratification. At sedentary sites usually more people lived together for a longer time compared to earlier base camp sites or annual gathering sites. This created deeper cultural layers and thus generally richer archaeological materials. There are also indications that the use of rock art is connected to sedentism, both pre-agricultural and agricultural forms.

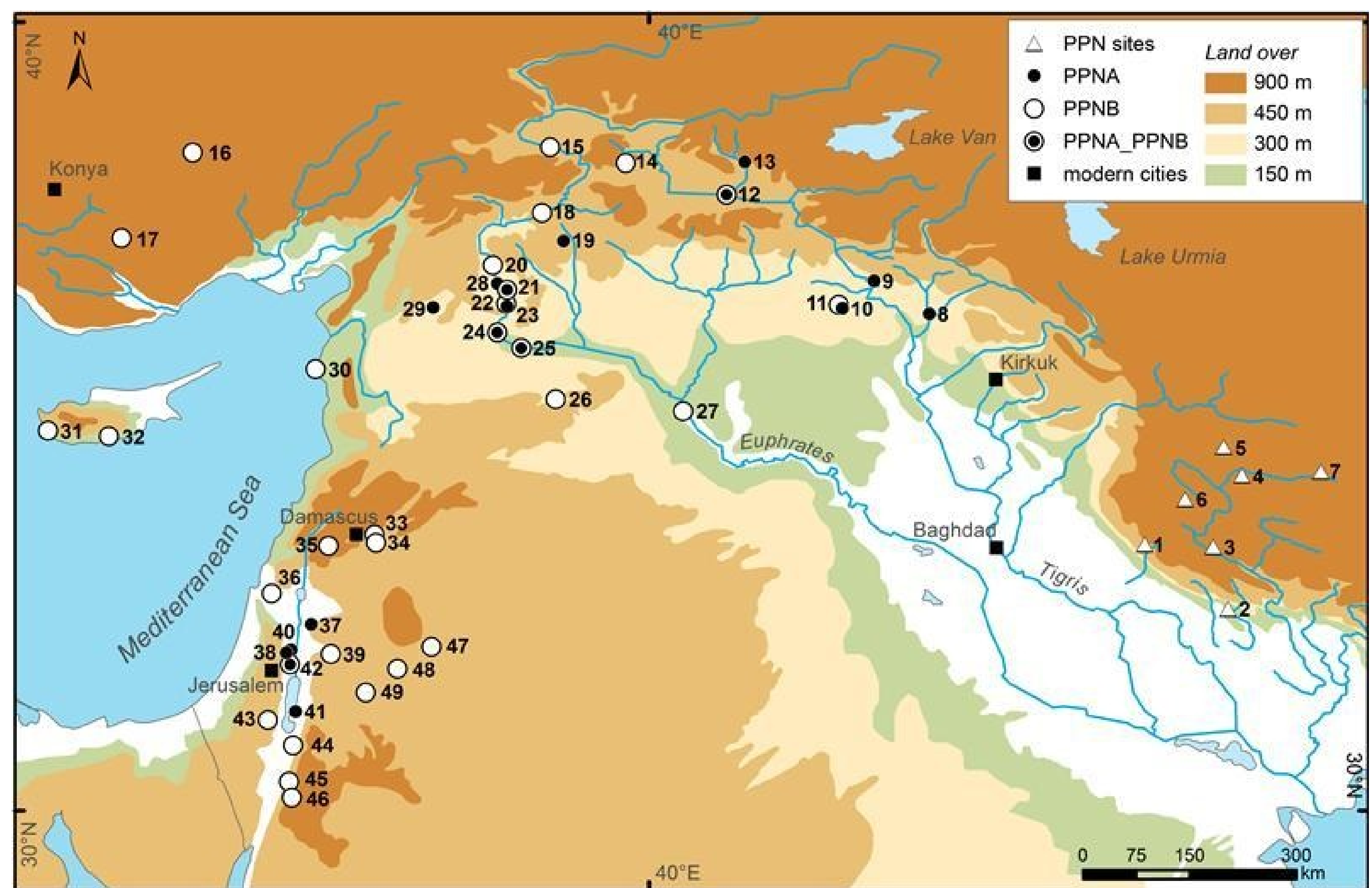
The suggestion has been made that sedentism is perhaps not so much the result of resource abundance as it is the result of population pressure or resource stress that forces groups into a more sedentary existence when they would prefer to stay mobile. Although it is true that some individuals, particularly active hunters, may view movement as desirable, it is equally true that large segments of, if not entire, hunter-gatherer communities view camp moves as onerous work that is best avoided if possible. The aged, the infirm, the women who must carry infants and the bulk of family possessions and set up new camps, the young children, and the less energetic hunters would all view sedentism as highly desirable if resources could be assured from a more permanent base. Moreover, if sedentism were adopted by most community members, it would hardly impede other individuals from

undertaking long-distance visiting, hunting, or other trips.Thus, there is every reason to believe that far from being "forced" into sedentism by various pressures, most hunter-gatherers considered group mobility to entail undesirable work and welcomed the opportunity to become more sedentary.

The advent of food production and domestication is not the first time that people settled in villages of some sort but it does seem to mark a bold beginning when it was accompanied by an elaborate investment in facilities and, probably, by some emphasis on ownership of productive land and house plots. With the emergence of a sedentary way of life, it made sense for the first time to devote a considerable amount of effort in building permanent dwellings. For the first time, in fact, it was possible for humans to invest for the long term. Accordingly, almost immediately after agriculture appears, the archaeological record begins to show a variety of solid dwellings of a more or less permanent sort, which make indigenous use of local building materials. These dwellings were built in clusters for various economic, cultural, and social reasons. They formed the basis of early settlements in human history. Some of these settlements grew in size and became farming villages. Kili Gul Muhammad in the Quetta Valley and Mehrgarh in the Kachi plain demonstrate this kind of transformation.

More than thirty years after its original publication Binford's distinction between residential mobility and logistical mobility, between collectors and foragers, remains an important interpretative starting point for evaluating sedentism (11,12). Binford's concepts have stood the test of time because they begin from the premise that sedentism is not a simple on/off switch – something a society has or does not have. As Kelly puts it, 'no society is sedentary, not even our own industrial one – people simply move in different ways' (9). As a result sedentism should be measured in degrees and qualities, not by presence or absence. When understood as a process, sedentism becomes a complex phenomenon which demands investigation in its own right. In particular, it can no longer be reduced to an effect of, or precondition for, some other transformation – notably agriculture.
ing einkorn and emmer wheats, rice and barley, during the Younger Dryas when the natural yields of these cereal grasses would have been reduced. There is little evidence on this point, but in gathering, preparing and storing these grains, they were laying the technical basis for their successors to do so. Once people were settled, many new opportunities for human innovation were opened up in technology, trade, warfare and political organization. This period of human history in the Near East has been discussed in Chapter II.3. in some detail.

The Jomon culture in Japan, which was primarily a coastal culture, was sedentary from ca.



Middle East connection with the earliest Neolithic sites (*Simone Riehl of Tubingen University*)

The First Evidence of Settled Life: The first clear evidence of a successful and long term settled community comes from people called the Natufians, who lived in the Near East from about 15,000 to 11,500 years ago (see the preceding Section). They occupied lands on the eastern side of the Mediter ranean, in the rgion that is now Israel, Jordan and Syria. The early Natufians gathered the wild emmer wheat and barley that grew there. They made stone sickles to cut the cereal grasses, and the sickles bear signs of the characteristic polish caused by the silica in cereal stalks (13).

Bar-Yosef suggests that the Natufians may have started to cultivate these wild cereals, includ 12000 to 10000 BC until the cultivation of rice at some sites in northern Kyushu. In northernmost Scandinavia, there are several early sedentary sites without evidence of agriculture or cattle breeding. They appear from ca. 5300-4500 BC and are all located optimally in the landscape for extraction of major ecosystem resources. In South Asia, where very little research work has so far been done, indications for sedentary living of hunter-gatherers of upper as well as lower Sindh around oxbow lakes (all of them later turned brackish) are unmistakable without any trace of agriculture (14). These lakes attracted wild animals and were also an abundant source of fish, and various edible plants grew

in their vicinity. What seems certain is that the food requirements of these people were amply met with from the resources available in and around the lakes and thus did not require the kind of long distance mobility that one generally associates with hunter-gatherers.



Sedentism and Social Change: If the adoption or abandonment of sedentism is a societal process independent of agriculture but taking place all over the globe at all times over at least the last

Water buffalo was one of the cattles domesticated at
12,000 years, we need to look afresh at how it is
Mehrgarh, Baluchistan

implicated in processes of social change. Several researchers have considered this question, directly or indirectly. It appears that to understand the social changes increasing sedentism might bring, it is first necessary to understand the nature of a society prior to the adoption of sedentism. However our understanding of Paleolithic societies has been much hampered by two fundamental problems (15). First, there has been a widespread belief that the archaeological record is too limited to permit any serious understanding of Paleolithic societies – so is precisely the reverse: how to manage social relations in the context of relentless co-presence in order that relationships can be sustained amicably. This is the question at the heart of Wilson's theory of *human self-domestication*. Once a society became sedentary, people were stuck with one another, and one way to manage this situation is through building houses and other architectural structures which spatially mark out and thus direct social interaction.

The emphasis placed on the appearance in the archaeological record of dwellings and other architectural structures as the core defining feature of a shift toward more sedentary living points to their importance for understanding the social changes which accompanied this shift. Sedentism critically changes social life, not simply because people are moving around less, but because they are constructing new architectural landscapes in which to dwell. This change has been explored in some depth by Hodder (17) in relation to the European Neolithic.



The domestication of of goats and sheep can be traced to early Holocene in the Near East as well as to Baluchistan and Afghanistan.

better to focus on technology, ecology and economy. Second, the earliest period of human development has always been envisioned in opposition to, and even as the inverse of, modern human society. Primitive man is by definition that which we are not. These problems have blinkered the way we approach Paleolithic archaeology. Fortunately, these limitations are now being vigorously challenged and a social archaeology of the Paleolithic is emerging.

Gamble (15,16) argues that the key social challenge of the Paleolithic period was the ‘release from proximity’, the stretching of social relations beyond everyday personal encounters so they could encompass sustained relationships in the absence of co-presence – a process made possible through the deployment of material and symbolic resources. In contrast, the fundamental social challenge which follows from the adoption of sedentism

Farming settlements are larger and more substantially built than those of most huntergatherer communities. The greater productivity of agriculture allowed larger groups of people to come together, and communities of several hundred could be supported by the produce of fields that lay within easy walk in distance of a central settlement. The permanence of family greater investment in might be substantial structures built of lime stone, mud-brick, pise (rammed earth), or wattle-anddaub.

These, in turn, revolutionized human experience of daily life (18). Households took on greater importance, their affairs hidden from the community at large. Nomadic hunter-gatherers live in conditions of great intimacy with one another and are often very sensitive to the unspoken moods of others; they do not live isolated from the rest of the community in closed buildings (though they often settlements encouraged

individual houses, which



The foundation wall and a wooden log at a house in neolithic village of Sohr Damb, Baluchistan

have impermanent shelter for sleeping). Houses, by contrast, with their hidden spaces, allow the accumulation of household wealth. There is a constant tension between centrifugal tendencies (the wellbeing of the community or village) and centripetal tendencies (the success of the individual household). Sedentary settlements also provide fixed points within the landscape and become a focus of identity (the place where you live), ethnicity (the community to which you belong), and ancestry (where you and your forebears were born and buried) .



A house wall at a Natufian settlement at El Wad, the Near East. The earliest evidence of sedentary life has been detected in this region.

With sedentism came a strong growth in the interconnection with individuals beyond one's immediate or extended family. It also induced an interaction between communities that seem to reflect a growth in what anthropologists call "exchange systems". The exact nature of these systems and why they seem to grow with the advent of village life is not well understood, but one of its primary aim seems to be an attempt for reducing risks: the risk of crop failure, the risk of pestilence, the risk of floods, etc. Most of these exchange systems were purely social in nature but there were definitely some that can be characterized as economic. This is the beginning of trade. Whatever the reasons, one thing is sure on the basis of evidence: there was a significant growth in what Possehl calls 'interconnectedness' among regional archaeological assemblages.

Sedentism, increased contacts and exchange with outside world, and the first cereals and cattle domesticated anywhere in the 'core zone' could have spread long distances through a stepping stone process, where the productive gift (the cereals, cattle, sheep and goat) was exchanged through a network of large pre-agricultural sedentary sites.

Dwellings and Storage Structures: Just



Excavations at the Early Neolithic site of Mehrgarh in Baluchistan

as the habits of Paleolithic man as a hunter and gatherer had harmonized with those of the natural world, so, too, his dwelling had made little or no difference to the prospects of nature. Caves and rock shelters, and low and shapeless huts, were hardly more conspicuously artificial than bird's nests or warrens. But with man's entry into the Neolithic phase he began fairly rapidly to assert himself, even though for the most part his buildings still lacked the formal qualities of true architecture. In many parts of the world villages grew up with houses that in one way or another asserted man's imaginative power and new control of materials.

In the Neolithic stage of economy, houses were everywhere built of local materials. These always played a considerable part in determining the plan and construction of the building. Some raw materials are more suitable to build rounded structures and some are more suited for constructing rectangular buildings. Stone, mud-brick and most other forms of pise can be used equally well for either. Pit dwellings tend to range from roughly round to sub-rectangular because exact shapes and straight lines are not easily produced by digging into the ground with primitive picks and spades.

Climate is, of course, another natural factor strongly affecting domestic buildings. Whereas in warm countries flimsy modes of construction might go with reasonable domestic conditions, solid wind- and rain-proof houses were essential in many parts times and afterwards was to make it into rough blocks, or moulded bricks. These, having been either patted up on a flat surface or pushed into a rectangular mould, were put out to dry in the sun. As the sun could effect no chemical change such as

! takes place when a brick is kiln-fired, the pise blocks were liable to dissolve or crumble. A house built from them might not stand for more than two generations. As, however, it disintegrated without leaving any awkward and intractable rubble, a new

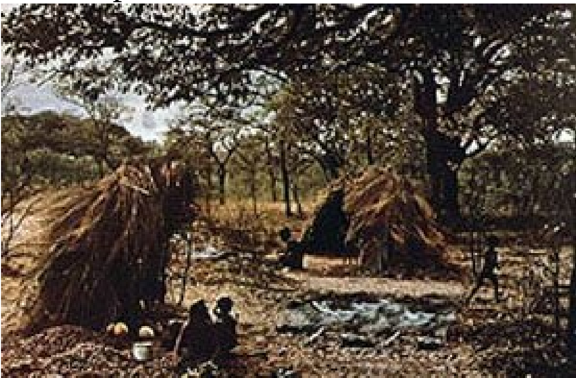
one could easily be built on top of it. This relatively rapid replacement of pise and other mud buildings
is the chief explanation for the accumulation of
of various species of animals produced the specialized pastoral groups who
mounds on permanent settlement sites.
appear to have continued in existence through the ages, even into modern times.
The oldest-known farmers' houses in PakiSome of these pastoral people were nomadic but they nevertheless *produced*
animals rather than
hunted
stan are those of Mehrgarh and Kili Gul Muham
them in the wild. On the other hand, themad, both in Baluchistan, dating back to ca, 7000
BC. In both of them mud-bricks have been em

domestication, or successful exploitation, of various species of wild plants



ployed for constructing of rectangular buildings, produced the shift towards sedentary settlements, which largely subsisted on some of them having no doors and hence consid

agriculture. This adaptation came to dominate the subsequent economic and
ered to be warehouses for grain. These have been
cultural develop ments which are the topic of this chapter.described in some details in Section V. Pit houses
are known from 'Northern Neolithic' in Kashmir and
At this point there is a marked shift in the geographical focus of Pakistan's



A settlement of a quasi nomadic group herders in Siestan archaeology. One now
at the Iran-Pakistan borders. leaves the trail of the Late
Paleolithic peoples in

of the Old World. Cold, and more particularly windy,Pothowar, the Rohri Hills,
climates encouraged the sinking of house floors anybelow ground level and the screening of the ensouthern NWFP, or
trance to the living room with a porch or anteroom.other area they might be
Again the sun-dried brick or other pise construction,living in. One also looses

so popular in south-west Asiathe andfootprintsBaluchistan, the were out of the question in more temperate lands of
hunters where rain was frequent and the sun lacked the Mesolithic
necessary hardening power. gatherers-fishers in southern

Pise typically consists of soil tempered with
plains of the Indus, the


chopped straw or dung, mixed with water and wellcoastal regions of Makran, **Early Neolithic settlements may not look any different than**trodden. It can be raised into solid walls between**this semi-permanent clusters of houses in western Sindh**
plank caissons, but the usual method in Neolithic

the shores of various lakes, the banks of small rivers, and the foothills of the western mountain ranges. The interest no longer lies with hunters and gatherers. Instead, it shifts to the growth of distinctly agricultural communities in the vastPothwar. They were most likely stretch of land between Makran and Bannu on one hand and the western fringes roofed with vegetable structures of the Indus plain on the other. This too marks a long span of about 4000 years,as some postholes have been from c.7,000 BC to c. 3,500 BC.

detected around the residential or storage pits.
It is during this time that some major transformations take place to the west of
Technology and Crafts: The
role of technology is being mini
the Indus, and it is in the course of this development that the roots of the subsequent Indus Civilization lie. Starting with this chapter
mized by archaeologists in their
we shall follow the

recent discussions of the Neocourse of this development and witness itslithictransformationsettlements. intoThismaturein agricultural villages and small towns which were the precursors of the urban sharp contrast from the time just civilization that followed.

a few decades ago when the whole period used to be disThe relationship of the two trends, i.e., domestication of animals leading to cussed in purely technological



terms. It appears that the pendu
pastoralism and the cultivation of certain plants and trees leading to agriculture, lum has swung too far to the

in their earliest stages is still not clear. Moreover, it must be repeated that in an

Black tents of Baluchistan. These nomadic people are primarily pastoralists but there is evidence that they opportunistically also become sedentary pastoralists or even partly agriculturist. It all depends on the resources.

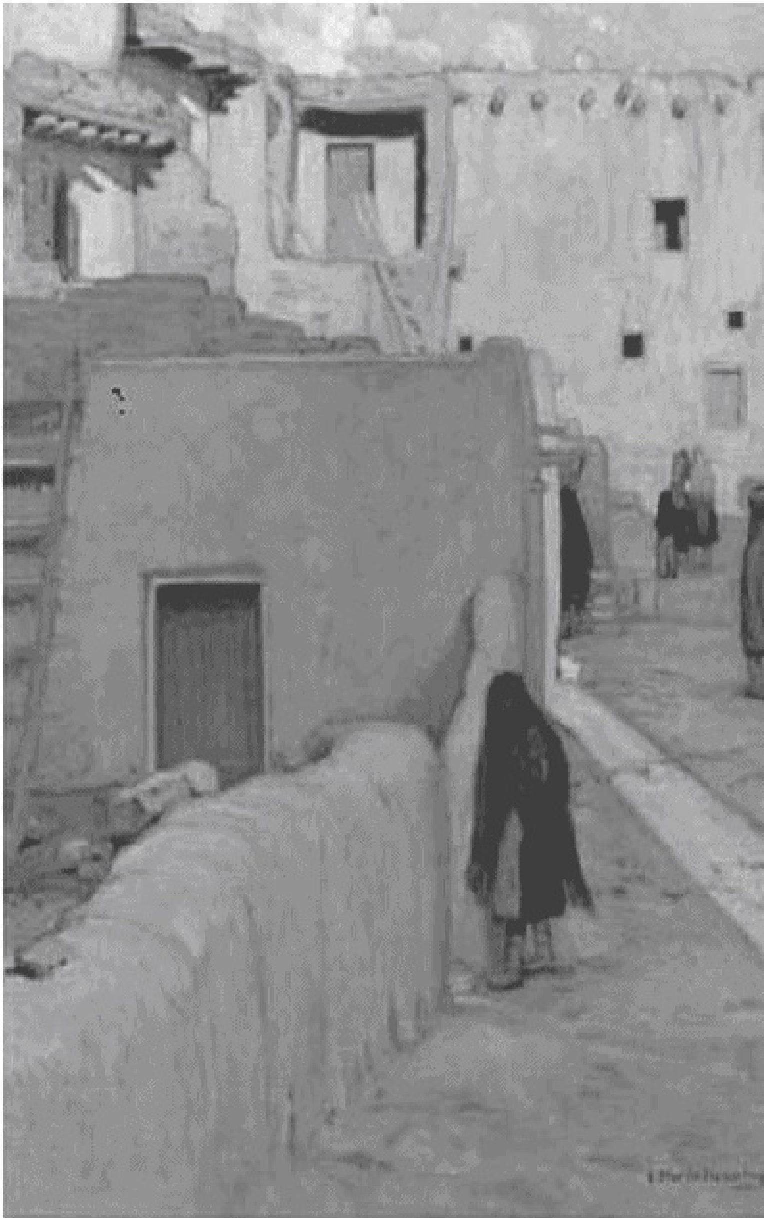
other direction. The sociocultural or economic aspects are definitely important in describing

 the life of the ancient man but the technological aspects are equally pertinent. It would be a mistake to downplay the role of technology in the emergence of man's sedentary lifestyle based on agriculture and domestication. Sedentism, change in human social organization, and alteration in human demographic patterns must have influenced the development of required technology but

Preface !the reverse could also be true.

Tools: The rapid developments in toolmaking technology, as manifested in microlith, composite, and polished tools, and the use of better and diverse raw material to make these tools, made it possible for the Neolithic man to make rapid inroads toward the development of agriculture, better utilization of domesticated animals, storage of food, and making his dwellings for a sedentary lifestyle. Since man no longer had to be on the move continually, the tools no longer needed to be portable. This means that the 'toolkit' of agriculturists could expand. The new conditions of life encouraged expansion of technology because, for the first time, specialization became possible. Some individuals

between
correct this
putting an
story of
Indo-centric
of
so with



cultural **The late Neolithic houses in Pakistan may not be much different from these modern village dwellings in Punjab**

who were skilled at making clothing or working with wood, for example, began to invest almost all their time in those activities.

Surprisingly, this dramatically new way of life was not very dependent on new technology. On the contrary, in the earliest phase of development, pioneer farmers used techniques and tools which had long been familiar to hunters-gatherers: the stone axes (now polished), hoe, and sickle for preparation of the fields and harvesting the grain.



Neolithic dwellings could range from rudimentary huts and cave shelters to well-made mud-dwellings like these.

The primitive milling device for grinding grain between two stones had been in use for thousands of years by peoples who collected seeds but did not plant them. A review of the Neolithic tools has been given in one of chapter with reference to Mehrgarh.

Pottery: It was long held to be axiomatic that true Neolithic cultures included the craft of potting among their skills. After agriculture made a settled home both possible and necessary, man invented the processes of forming and firing clay. The incentive was probably provided by the need for watertight containers and cooking-vessels, and to contain cereal foods and perhaps dairy products. So the argument went. It remains true up to a point but we now know what farming and a settled life had been established, at any rate in SouthWest Asia and the eastern Mediterranean, thousands of years before the invention of fired pottery. As we see at both Jericho and Jarmo there was a long period of occupation before pottery came into use. At Jericho the first pots can be dated to about the middle of the sixth millennium BC, while the settlement goes back towards or into the eighth millennium BC. When potting reached Jericho and Jarmo, the craft had evidently progressed beyond the experimental stage. Nowhere in South-West Asia the first tentative efforts at the firing of clay vessels been recognized, an invention of a kind that could easily be made in a number of different centers.

Compared to the Near East, there was a clearly defined pre-ceramic phase in Baluchistan as indicated at Mehrgarh in the Kachi plain, where the settled Neolithic communities practiced farming and animal husbandry and largely dependent on this subsistence regime from eighth millennium BC. The introduction of pottery among them has been dated to *ca.* 6000 BC. This fact has been used by some archaeologists to hypothesize that some traits of the Neolithic culture, such as the art of pottery, diffused from the east to the west, an opinion contrary to the generally accepted picture of the Neolithic cultures traveling west to east.

Of great historical interest is the determination of shapes by cultural tradition. In primitive communities these are quite often based on imitation of vessels made of materials other than clay - supposedly materials that were in use before the adoption of potting. We know that the Neolithic people of Mehrgarh and Kili Gul Muhammad often imitated the baskets which served them also as molds.The later-day elaborately painted wares of Baluchistan, like eastern Europe, South-West Asia agriculture, and and China, generally do not show much imitationpastoralism

permanent or semi-permanent settlements were a series of new crafts involving



advanced to a stage that important technical discoveries. Among these were the innovations in tool imitation was not neces

sary. As the early humaking, the manufacture of pottery, however crude and however basic, and the

development of decorative art. Archaeological evidence is scanty but it is there.
fied by purely functional,

Precious
items
the tempting surfaces of
found

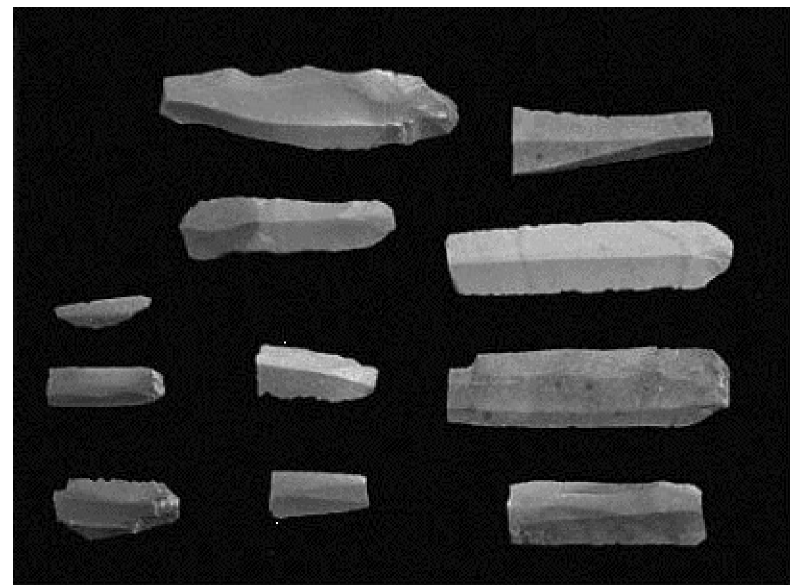
pots from the first atand other **An example of composite** tracted decoration sites provide**tools, a hallmark of the** early Neolithic
the use of color. Patterns
Neolithic all over the Oldevidence for the existence of a **World (***a model, not a real*network of long-distance*find***)**
tically applied or painted; this

incisions might be filledduring

with red or white clay for contrast, or even filledperiod. There werewith other substances (sand was used in Hakra beads made of turquoise from
Ware in Cholistan, southeastern Punjab). Some

times impressions were made with other objects, Persia or Central Asia, lapis lazuli
such as combs to obtain a series of wavy lines as from northern Afghanistan and
those exhibited, again, by the people of the HakracomeWare. shells which must have
in the

graves of Mehrgarh
and
incised, gouged out, plas
exchange even
formative



from
the coast
It has already been seen that certain elemen500 kilometers **Neolithic tools: top - polished tools, a hallmark of the**
tary coloring effects can be obtained by firing alone.away. The rise of handicraft is clearly in evidence, the most important of whichBut for more elaborate decoration painting is essen**the Upper Paleolithic.**
tial. This was usually done after the pots had beenis basket weaving from reed and grass. These baskets were sometimes lined with

air-dried but before firing. Often the ground color bitumen to make them waterproof. Handmade pottery appeared. It was soon might be simply the red or buff but in Pakistan, likefollowed by another type of pottery where woven baskets were used as molds.that in south-west and central Asia, an all-over slip the Near East must have been made during the Firing of pottery also ensued. Although subsistence mainlyseventh millennium BC if the Carbon-I4 dating is was used particularly to obtain a red or buff surface. depended on

correct. Similarly the impression of a coiled basket
The use of slips presupposes a great refinement inagriculture and pastoralism, hunting and gathering still played an important role.
the preparation of clay, for they are normally made in a grave at Mehrgarh dates to the same temporal

The presence of date and *ber* stones and the bones of wild animals mixed with
by dipping the vessel in a solution of the finest parhorizon. On the other hand, there may possibly
ticles. Slips may be burnished and left plain, but
those of domesticated animals in early strata at Mehrgarh is the evidence. have been textiles in Jericho at this time, as holed
stones which could be spindle whorls have been
their advantages as a background for painted deSimilarly, sendentism became the norm but some nomadism still persisted. sign are very great.
found there. There seems little question that like so
There is strong evidence that settled communities coexisted side by side with
Basketry and Textiles: Before the beginning many other things in the Old World, basketry was
of loom weaving, it is difficult to make a theoreticalnomadic pastoral communities in a symbiotic relationship.
This pattern offirst developed in Palestine, Iraq, Iran, and Baludividing line between basketry and matting on the
chistan. Since the first pots at Mehrgarh were made subsistence persisted to even modern times in some areas of Pakistan. one hand, and textile weaving on the other. Yet for
by using baskets as molds, it is presumed that the
art of basketry spread from Baluchistan to Iran, Iraq

the early Neolithic period in the Old World it is usuThe economy of these Neolithic cultures was one of subsistence agriculture, including plant and animal domesticates. It was largely an indigenous development but in some cases it might have received stimuli from outside contacts and influence from neighboring Neolithic communities, especially in the west of the borders in Afghanistan, Iran, and Central Asia. In some cases, of

ally possible to do so. The best touchstone for distinguishing between them, though it is not infallible, is that textiles are nearly always made from spun or twisted threads, while basketry and matting are commonly made from threads, bast, withies and the like that have not been spun and are quite often in more or less their natural state.

As spinning was itself an invention of some complexity, it appears likely that basketry would have been made before textiles. Probably it was, although evidence for it remains slight. The coiled rush-mats which left their impressions on the floor of the houses of the Neolithic period at Jericho in

!

settled communities. Also associated with

and the Levant. Probably the second oldest instance after Mehrgarh comes from Jerico and then from Jarmo, again it is represented only by mud impressions. Here the Neolithic villages also made woven matting. They had employed the plain weave technique by which either reeds form the woof on a warp of cords, or reed strips are simply interlaced. Such mat impressions have not been discovered at Mehgarh or Kili Gul Muhammad in Baluchistan but it is thought to be certain that the Neolithic Indus people did practice the art of mat weaving. This analogy comes from their early experimentation with basketry.

The production of textiles is an important part of craft production economies in two ways: first is to

do with craft and second with agriculture. In terms of craft, textiles are labor-intensive and timeconsuming to produce. They require labor in spinning, as well as weaving. In many traditional societies, textile production was carried out as a domestic activity, and women spent much 'surplus' time (i.e. when not engaged in basic subsistence and cooking activities) in spinning. Weaving is a highly skilled craft which must be learned, and different regional traditions of weaving are often distinctive and recognizable. The production of textile crops constitutes another important element of specialization in as much as it implies the use of land and agricultural labor resources for species that will not be eaten, and thus implies additional surplus production beyond what is required to feed families and communities. It is therefore necessarily production for trade, as fields of textile crops produce fiber far beyond what individual households are likely to use or have time, and perhaps skill, to process. Craft crops therefore constitute an important early "cashcrop", along with such things as valued tradable fruits.

Clothing: Most clothing in Europe appears to have been made of animal skins, as indicated by finds of large numbers of bone and antler pins which are ideal for fastening leather, but not cloth. However, wool cloth and most likely cotton might have become available during the Baluch Neolithic, as suggested by finds of cotton fibers in the threading hole of a copper bead recently recovered from Mehrgarh, dating back to the seventh millennium BC.

Metallurgy: There is no metals in the Neolithic period in any part of the world, beyond a few stray specimens of elemental gold and copper. Metallurgy was a later development and copper was the first metal produced through smelting of the ore. It was independently discovered in a number of different regions and appears to have been driven by social rather than economic or technical need. It is significant that in Europe, for example, gold was worked alongside copper from the very outset of the practice of metallurgy, yet gold had little practical application, and the earliest copper objects took the form of personal ornaments. In Pakistan too, copper was used more for bead making rather than for making tools. However, instead of gold, silver was the second metal obtained through smelting of the ore. It was surprisingly used for making of tools, as the excavation of Nal in central Baluchistan indicates. Tools of chipped or polished stone continued to be used for the majority of those practical tasks that required sharp-edged implements, and metal tools only replaced stone for everyday use in Europe in the late 2nd or 1st millennium BC, 4000 years after the first exploitation of copper and gold.

Agricultural Technology: Increased reliance on sedentary cultivation led to the development of a wide variety of agricultural implements, from digging sticks used to break up the soil and stone axes to clear forested areas to the introduction of the plow. Techniques of seed selection, planting, fertilization, and weeding improved steadily. By the end of the Neolithic period, human societies in a number of areas had devised ways of storing rainwater and rechanneling river water to irrigate plants. The reservoirs and canals, dikes and sluices that permitted water storage and control represented another major advance in the ability of humans to remake their environment. These changes protected the thin and fragile soils of the tropical or semitropical areas from the sun and torrential rains.

Society: The life experience of the Neolithic peoples must have been quite unlike that of their hunting forebears of late Pleistocene times. Probably in many fundamental ways the difference was greater than peasant in, predecessor 8000 years ago. More than anything else, this contrast was the domestic and social revolution that went with living in more or less settled homestead, hamlet or village. It

might be said that for the individual the psychological change was the substitution of routine of hard work for excitement and uncertainty, while the social counterpart was a new stability demanding greater discipline and more social control. Hunters' foresight in making tools and setting traps was nothing compared with that asked of the peasant when he fed animals in order to have their young and their milk, or kept seed grain for harvest a year later. This dramatic, even revolutionary change in society has been discussed by many scholars, but most of this is a speculative subject.

Property Ownership: Settled agriculture, as opposed to slash-and-burn varieties of preagriculture hunter-gatherers, usually implied some forms of property so that land could be identified as belonging to a family, a village, or a clan. Only with property was there incentive to introduce improvements, such as wells or irrigation measures that could be monopolized by those who created them or left to their heirs. But property meant the need for new kinds of laws and enforcement mechanisms, which in turn implied more extensive social structure.
between experiences of a modern

say, Baluchistan and his Neolithic

Obviously the new bond with the soil made its ownership a matter of great social importance. The rather loose forms of possession, sufficient for hunting grounds would not do for cultivated fields. Forms of land ownership must always escape archaeological detection, and they have to be inferred from those of present-day primitive farmers and from those that were prevailing when written records began. Through these comparisons it appears that arable fields belonged to the village community and might either be worked communally or assigned to individual clans or families for cultivation. Pasture was presumably held in common as it is the custom in many areas of Pakistan and Afghanistan. Some people may have owned their livestock communally



A piece of pottery from Neolithic Jordan



Neolithic pottery from Sohr Dam, Baluchistan

and thus have come nearer to the true nomadic pastoralism. Not infrequent among modern people of Pushtun country, Baluchistan, and the Thar in Pakistan, all uncultivated land is expressly recognized

as belonging to the clan; if it is cleared and worked, it becomes the property of the family responsible but reverts to the clan should the family dies out and the land falls in disuse.

There is good reason to suppose that family or genealogically related strengthened through these ments. The owning group became smaller and smaller, often a joint family or other kinship group and not a classificatory clan or tribe. The remnants of this historical change, which seems very likely to have begun with the Neolithic way of life, can be seen throughout the peasant societies of Pakistan, kinship group was

ownership arrangeespecially in the tribal societies of the Pashtuns and the Baluch.

Irrigation calls for a special kind of common social effort and social control in a farming community. It is quite evident from the Neolithic settlements in southern Baluchistan, especially in Las Bela region, that the *gabarbands* found there could not have been constructed and maintained without a robust collaboration of the community which must have some tangible interest in the fruits of such a venture.

Social Stratification: Forms of leadership and authority among Neolithic communities are almost as difficult to infer from archaeological evidence as are forms of ownership. It is obvious enough, however, that the possession of land, livestock and greatly increased domestic equipment would lead to more disputes and a need for greater social control. Where irrigation was practiced, this need would be increased still further: disputes about water could have been among the oldest cause of litigation. On the other hand the various kinds of communal property-holding that we have supposed to have been general in Neolithic times are less likely to give rise to trouble than private ownership.

Theoldegalitariansystemofhuntergatherers gave way to a complex system where the need for a preeminent person or a group of persons was felt. This became even more essential when man had to deal with other individuals of the village who were not the members of one's family. At this stage, the development of a hierarchical, or even a hereditary system of authority has been theorized by some anthropologists. Based on some ethnographic studies of living hunter-gatherers and marginal agriculturists in Australia and the Kalahari in Africa, however, there is little scientific evidence for such a social stratification. Settlements such as Catalhoyuk in Turkey and Mehrgarh in Baluchistan reveal a striking lack of difference in the size of homes and burial sites, suggesting a more egalitari a n s o c i e t y with no evidence of the concept of capital, although some burials do appear slightly more elaborate than others.

Notwithstanding the largely egalitarian nature of the early Noelithic societies, later Neolithic societies were unquestionably more hierarchical than the social set up that preceded them. The domestication of animals could may have contributed to social inequality. Possession of livestock allowed competition between households and this should have re


A woven basket from Fayum Neolithic (Egypt)

sulted in inherited inequalities of wealth. Neolithic pastoralists who controlled large herds gradually acquired more livestock, and this may have made economic inequalities more pronounced.

Specialization: The Neolithic economy demanded greater specialization of labor and skills than had existed in gathering and hunting societies. It was, however, still at its elementary stage, increasing only with the approach of urban conditions.There is practically no evidence for fulltime specialists in ordinary village life. Every family seems to have undertaken all forms of labor and craftwork for itself. Even in cultures where the finest painted pottery made, each household may have been capable of making its own. Probably individuals gifted in particular crafts were occasionally employed by their neighbors and paid for their trouble in grain or other food. There may, however, have been a few specialized workers outside village community. For instance there may have been odd individuals who specialized in trade, going from one community to another with shells or other soughtafter raw materials, usually decorative stuff for personal ornaments. Neolithic villagers certainly did acquire luxury objects from afar, and sometimes basic raw materials from outside their own immediate countryside, yet fundamentally the Neolithic economy is characterized by small, self-sufficient communities.

The key elements of the productive system for small-scale agriculturalists are land, labour, and surplus. Characteristic of all farming cycles is that there are activities requiring intensive labor within a restricted period of time, such as land clearance, planting, weeding, and harvesting. In small-scale farming these labor bottlenecks cannot be overcome by expensive technology, as in mechanized agriculture, so the amount of labour available was a major limiting factor on production. Moreover, given the risks and uncertainties of farming, and the small scale at which an individual household operated as a productive unit, subsistence farmers invariably had to help each other out with between-household exchanges of food, equipment, and labor. In the ethnographic record such exchanges take a variety of cultural guises ranging from simple sharing to the provision of feasts in formal social contexts, and from hospitality in the context of "casual" visiting by needy neighbors or relatives to more or less blatant exchanges of food in return for goods and services. Sahlin (19) called such networks of obligation and mutual support 'balanced reciprocity', in which a gift anticipates an equivalent return; he contrasted this with the 'negative reciprocity' of more hierarchical agricultural societies characterized by differential access to land, labour, and surplus, whereby something is obtained for nothing in relationships between unequals (20).

Role of Women: The role of women in Neolithic societies has been hotly debated in recent years. By virtue of their key roles as plant gatherers in pre-farming cultures, it can be surmised that women

played a critical part in the domestication of plants. Nonetheless, there is evidence that their position declined in many agricultural communities. They worked, and have continued to work the fields in most cultures. But men took over tasks involving heavy labor, for example, land clearing, hoeing, and plowing. Men monopolized the new tools and weapons devised in the Neolithic era and later times, and they controlled the vital irrigation systems that developed in most of the early centers of agriculture. As far as we can tell, men also took the lead in taming, breeding, and raising the large animals associated with both farming and pastoral communities. Thus, though Neolithic art suggests that earth and fertility cults, which focused on feminine deities, retained their appeal, the social and economic position of women may have begun to decline with the shift to sedentary agriculture. This is, however, a conjectural position and may have a lot to do with the 'feminist' movement of the past several decades in the Western world.

Warfare: The primary Neolithic way of life seems generally to have been a peaceful one not given to warlike adventure. None of the Neolithic settlements in Baluchistan and Sindh, for instance, had defenses. It was only in late Neolithic times that townwalls started to emerge. Even here, it was usually on a scale more appropriate to protection against marauding animals than against human enemies. The general absence of weapons of war among the grave furniture of Noelithic burials, including those excavated at Mehrgarh and Nal in Baluchistan, provides even more convincing proof of the absence of martial ideals in the hearts of the new peasantry. Although it is rash to push economic explanations too far, it seems probable that the fact good land was to be had for the taking and each succeeding generation could find a good living did partly account for the peacefulness of early Neolithic communities.

Demography: Population growth in the Neoilithic has been the focus of spirited debates, especially the question whether it was the consequence of agriculture or a cause of it. One view has been that population growth followed the beginnings of farming: the use of domesticates meant more food, and more reliable food supply, thus enabling human populations to grow. The opposing view has been that growth in population, stimulated by other factors, forced people to become farmers, because rising populations meant the necessity for more efficient means of food production if starvation was to be avoided. We shall revisit this question again a little later within the present Section.

The fact that, at the global scale, population levels rose dramatically with the transition from the Pleistocene to the Holocene is not in doubt, nor that a general correlation can be observed between the ensuing rise in global populations through the Holocene and the development of societies based on agriculture. What also seems to be indisputable is a common link between sedentism and population growth, though as we have seen above, sedentism was not necessarily correlated with farming. However, beyond reflecting on the possible implications of general models of population growth, it is frustratingly difficult to plot the rate and scale of population growth, far less changes in age structures, at temporal and spatial scales that would be useful for advancing the debate about population increase as cause or consequence of agriculture. We shall return to this topic again in context of the neolithic Pakistan.

Parting Thoughts: For something like a million years humans had been living as hunters and gatherers. Durind all of this time, like all the other creatures that had evolved with them on the face of the earth, they were wholly dependent on what nature provided for shelter, clothing, and above all for food. Such supplies were often precarious, almost never constant, and kept men ever on the move. Possessions were a handicap, even children had often to be limited in number. The most important

change that ensued when man began to control his natural environment was that he was able to settle down. Great possessions became at least a possi

Almost all subsequent human history and development seems in one sense a consequence of the pivotal transition from the foraging lifestyle to a settled, structured society

bility, substantial and enduring houses were worth the building. Children could live where their parents had lived, inherent what they had made, and their numbers could increase.

These changes were so profound that the process has been rightfully called the *Neolithic Revolution*. It was nevertheless a slow process and it took place over a great range of time. Beginning some nine or ten thousand years ago in the vast core area of Middle Asia, of which Pakistan seemed to be an integral part, it took between three to four thousand years to reach western Europe on the one hand and a similar length of time to China and a large part of India on the other. Yet the concept of the Neolithic Age remains useful so long as it is understood that it is not a time phase falling between exact dates, but represents the period between the end of the hunting way of life and the beginning of a full metal-using economy, when the practice of farming arose and spread through much of Europe, Asia and north Africa like a slow-moving wave.

The Neolithic economy generally depended upon mixed farming and animal herding. The oldest settlement sites known to us in Pakistan and falling between 7000 and 6000 BC were already dependent on both domesticated animals and cultivated cereals. Before this, if either stock-breeding or agriculture were ever independently established as the basis of a full existence, we have no knowledge of it. As for nomadic pastoralism, it might easily be overlooked as it would leave scanty traces. Certainly, on the vast Eurasiatic steppes, where it was afterwards to flourish, it does not seem to have emerged until several millennia after the earliest settlement of farmers.

The practice of farming, and life in settled hamlets, can be accepted as the first mark of the full Neolithic Revolution. Certain particular items of culture so often accompany it that they deserve mention in any definition of Neolithic culture. One is the polished axe or adze, made of igneous rock or flint, the other the saw or the sickle, more or less on the Natufian or the Mehrgarh models. The crafts of potting and weaving were soon to become the most important additions to Neolithic culture, but they were, as shown in the body of this chapter, secondary traits following upon the essential innovations in farming life.

The ‘cradle’ of the farming economy with more-or-less settled villages has proved difficult to place exactly in either time or space. Perhaps it is not surprising because the beginnings of things are by nature elusive, being often both humble and illdefined. Furthermore, genesis of agriculture is not likely to have been closely localized. Ideas such as the sowing of crops and herding of animals can easily spread; they are far more readily adopted than changes in tool-making and other traits of culture. Providing the land and climate were suitable, peoples of different traditions could accept the Neolithic revolution.

The idea of raising crops by deliberate sowing, and of domesticating animals taken from wild herds, may have happened at several times and places in human history. It seems almost certain, indeed, that the whole agricultural revolution was achieved independently in Middle Asia, stretching from the eastern shores of the Mediterranean to the banks of the Indus. It was the purpose of this chapter to try to introduce in outline the emergence of a new economy and a radically new culture; its details need

to wait for the rest of the book.

II.2. The Neolithic Transition in Pakistan - A Preview



In Volume I (*The Stone Age*) of this series we left the Paleolithic Indus man making his tools in the Rohri Hills, fishing around lakes in Lower Sindh, hunting game on the fringes of the Thar, running after wild goats and sheep in the

foothills of the Sulaimans, gathering seeds of wild barley and other grasses in the Kirthar Range, and collecting fruit and nuts in the wilderness of Pothwar. His toolkit was quite diverse, it included the straight-edge stone blades and delicately fashioned burins, along with the bifacial handaxes, cleavers, and scrapers of various types, which were reminiscent of the earlier times. He even did not shy away from the continued use of choppers and chopping tools of still earlier age. As the last glaciation intensified, ca. 20,000 years ago, we noticed the thinning of human population in the North as well as in the South. The mobility of the hunting-gathering bands started to decrease and they began to gather around some choice locations where fresh water and food sources were available all the year around. These locations were along the perennial rivers in the foothills of Baluchistan and the Pashtun country and on the shores of fresh-water lakes in Sindh. Taken together, human population probably decreased as the Glacial Maximum reached *ca.* 20,000-22,000 years ago.

When we meet him again in the 8th millennium BC, we find the Indus man settling down in small hamlets and villages in the Quetta Valley and the Kachi plains of Baluchistan and a little later all over Baluchistan and western Sindh. Here, we observe him engaged in small scale agriculture and animal keeping. It appears that his emerging skills in taming and breeding of wild animals and his dexterity in harvesting of grain-bearing grasses must have given him a reason to settle down in fixed places where the availability of water could be assured on permanent basis, vegetational food was to be had aplenty, and game was to be had rather easily. During the same time, we observe his tools shrinking in size and becoming much lighter. Since these miniature tools, the so-called *microliths,* could be hardly used as such, we surmise, and probably rightly so, that they were assembled into *composite* tools, such as saws, sickles, spears, and stone- or bone-tipped arrows, a few examples of which we find at Mehrgarh, a settlement of eighth millennium BC on the border of Sindh and Baluchistan. The miniaturization of stone tools and combining them into more complex composite tools technically enhanced the chances of survival for these populations during the fast changing environment of the late Pleistocene and the early Holocene. These developments fall between the terminal stage of the Stone Age and the beginning of agriculture and animal husbandry. It is a transitional period, changing from a food gathering people to a food producing society, from a nomadic existence to a settled life in fixed locations. This is the starting point of the story told in this volume.

This transitional phase ushered man into an important period of his evolutionary history when he started to *produce* food instead of *obtaining* it from his environment. Domestication of various species of animals produced the specialized pastoral groups who appear to have continued in existence through the ages, even into modern times. Some of these pastoral people were nomadic but

they nevertheless *produced* animals rather than *hunted* them in the wild. On the other hand, the domestication, or successful exploitation, of various species of wild plants accelerated the shift towards sedentary settlements, which largely subsisted on agriculture. This adaptation came to dominate the subsequent economic and cultural developments which are the topic of this chapter.

The time period that has been assigned to this transformation in Pakistan, according to some estimates, spans between 15,000 B.C. to 8,000 B.C. Some would like to have it between 10,000 B.C. and 7,000 B.C. Still others would estimate its duration between 12,000 B.C. and 9,000 B.C. and some would even deny the existence of such a discrete transition period in context of Pakistan and the surrounding region on the east as well as on the west. This diversity of opinion largely stems from the type of evidence one values the most or one chooses to look at: some would put more emphasis on anthropological considerations while others would rely more on technological evidence. We need to sort out these arguments and come to some workable parameters for characterizing this important phase of human history and defining its temporal and spatial outlines.

At this point there is a marked shift in the geographical focus of Pakistan's archaeology. One now leaves the trail of the Late Paleolithic peoples in Pothwar, the Rohri Hills, the Pashtun country, or any other area they might be living in. One also looses the footprints of the Mesolithic huntergatherers in southern plains of the Indus, the coastal regions of Makran, the shores of various lakes in Sindh, the banks of small rivers in the Kohistan, and the foothills of the western mountain ranges of Baluchistan. The interest no longer lies with hunters and gatherers. Instead, it shifts to the growth of distinctly agricultural communities in the vast stretch of land between Makran and Bannu on one hand and the western fringes of the Indus plain to the edge of the Thar Desert on the other. This marks a long span of about 4000 years, from *ca.* 7,000 BC to *ca.* 3,000 BC. It is during this time that some major cultural and economic transformations take place in Pakistan, and it is in the course of this development that the roots of the subsequent Indus Civilization lie.

As a result of research in Baluchistan, we have a fairly good idea about the beginning of settled life in Pakistan, commonly known as the *Neolithic* period. We also know quite a bit about human life in the Upper Paleolithic period over a larger part of the country. We do not, however, have much to go by for the intervening period, that is between the Upper Paleolithic and the Neolithic. This is in spite of the intuition that a transition period must have existed that connected the later part of the Stone Age to the beginning of farming and pastoral communities. By necessity, therefore, we take advantage of the extensive research which has been conducted in the Near East. The inferences taken from one region and applied to anther region is fraught with false conclusions but when used judiciously they can be of considerable value. The detail treatment of such a Paleolithic-toNeolithic change in the Levant and the later developments in agriculture in the Near East, described in the next section, is in keeping with this assumption.

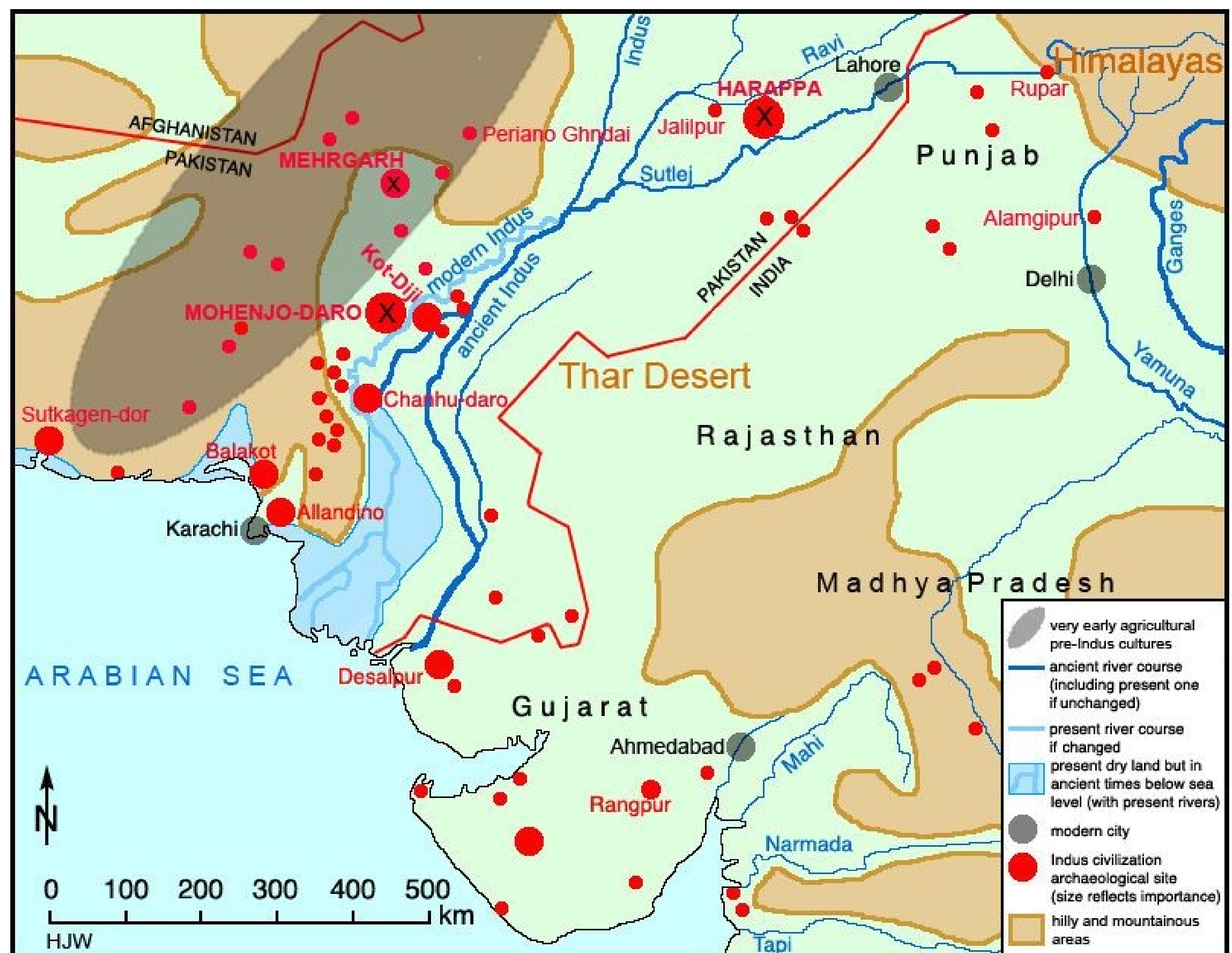
The development of early settlements in Baluchistan and the Kachi plain is a special time in the prehistory of Pakistan. It is through the passage of this stage that the Indus man entered the stage of fully developed village farming communities and eventually graduated to an urban civilization. The rest of this book will examine the cultural development in time period and see how it led to regional cultures of fully developed village farming communi

In this chapter our main area of interest is the one shaded in grey. It is here that the early Neolithic developments in the Greater Indus Valley took place and it is here that the

early agriculture took hold.

ties and well-heeled pastoral societies. This chapter is just a preview of what follows.

A few points need to be made or repeated again. First, it must be emphasized that the Neolithic agriculture developments did not happen uniformly over the whole area of Pakistan, or even over a large area of Baluchistan. In an area as large as Pakistan, with its major divergences of climate and physical environment, it is most unlikely that a single pattern would be found throughput. Some areas took the lead while the others followed. Second, the nature of the ‘culture’ that developed in various parts of the country was not the same. While the general direction to the development of agriculture and pastoralism was similar, each region differed in its material culture from the other, such as the presence or absence of pottery and the type of house construction. Although regionalism was the rule, the various regions were by no means isolated. They interacted rather intensely and the various transition or interaction zones are quite evident. The Indus man was engaged in long distance exchange from early on, a trend that persisted to the time of urbanization. Third, we observe a substantial increase in overall population which is indicated by increased number of sites and the size of the individual sites. Fourth, one must admit that we do not have a pre-agriculture site at hand anywhere in Pakistan or in the immediate neighborhood which could tell us about the



process of ‘neolithicization’ of the Greater Indus

Valley. We must, therefore, read the available evidence in conjunction with the evidence available outside the region.

Finally, and most importantly, the Indus man did not stop being a hunter-gatherer altogether; he merely supplemented his *gathered* food supply by *produced* grain, and his *hunted* meat with *produced* meat. With time, the hunting-gathering diminished in importance and agriculture and stock breeding took its place. The greater labor involved in cultivation and the fact that it did not at first greatly enhance the peoples' security or living standards caused many bands to stay with long-tested subsistence strategies. Through most of the Neolithic period, sedentary agricultural communities coexisted with more numerous bands of hunters and gatherers, and migratory cultivators. Even after sedentary agriculture became the basis for the livelihood of the majority of the inhabitants, hunters and gatherers and shifting cultivators held out in many areas of the country for a long period of time, some even up to recent times.

We can divided the development of agriculture and farming village communities in Pakistan into three main adaptive eras.The first was probably a period of small, semi-permanent gathering settlements which lasted 10,000-8000 B.C. Drawing from the contemporary evidence from South-West Asia, this is the time period when hunter-gatherers started to gather together for extended periods of time around water holes, lakeshores, and perennial water streams. Archaeologists have recently found quite a few such settlements in Sindh around some lakes, now dry or rendered brackish. It is during this period when humans started to tinker with the domestication of plants and taming of some wild species but still depended on gathered food.

The second stage we may call the period of early dry-farming and caprine domestication, and it seems to have involved predominantly emmer wheat *(Triticum dicoccum)*, two-row hulled barley *(Hordeum distichum)*, goats *(Capra hircus)*, and sheep *(Ovis aries)*. This period lasted until about 5500 B.C., and its hallmarks are already familiar to anyone who has cared to have even a cursory look at Mehrgarh in the Kachi plain at the borders of Sindh and Baluchistan: permanent villages, early hornless sheep, goats with helically-twisted horn cores, and cereal grain samples which show a mixture of wild (tough-glumed, brittle rachis) and domestic (brittle-glumed, tough rachis) characteristics. We do not know the beginning of this adaptive stage. The first settlement at Mehrgarh is dated to the beginning of the 7th millennium and the people of Mehrgarh were already agriculturists. If we assume that it could have taken for them at least a millennium to get to this stage of being predominantly agriculturists, we can safely take the beginning of agriculture and animal husbandry somewhere around 8000 years ago. This is more-or-less the same time period when similar developments were happening in the Near East, especially in the Levant.

The third adaptive stage involved the cultivation of bread wheat *(Triticum aestivum);* six-row barley which might be either hulled or naked *(Hordeum vulgare);* lentils; grass peas; linseed; cotton; goats, sheep, and domestic cattle *(Bos taurus)*. This stage featured irrigation in those zones where its use was feasible without elaborate technology. It was also characterized by larger settlements, sometimes walled, and their spread in the lowlands. We assign to this stage, i.e. the stage of village farming societies, a time period from 5,000 to about 3000 B.C. The terminal stage of this period saw the emergence of a complex social structure, some stirring of urbanization, expansion of artifacts, and intensification of inter-cultural contacts - in fact a prelude to civilization.

hunting and

to roughly

The Geography of the Early Neolithic in Pakistan: The site of Mehrgarh makes a central point of our enquiry in the development of agriculture and sedentary living in Pakistan. Its convenient chronological point is *ca.* 7000 BC, almost the same time horizon as the first agricultural settlements in the Near East. For the next two to three millennia the evidence of agriculture and sedentary living seems to be limited to Baluchistan, especially to the Zhob valley in the northeast, the Quetta valley and the Kalat plateau in the central section, the Las Bela plain on the coast and the valleys in the hills which come down to it from the Kalat side, and the Kej valley to the north of the coastal ranges of Makran. By the fifth and in some cases by the fourth millennium BC the Neolithic cultures seem to be spreading all over the major areas of the country and by the third millennium the farming village societies are seen to be giving rise to a expansive urban civilization.

As a result of vast explorations and excavations, the evidence of the spread of Neolithic Cultures in Pakistan comes from as many as three different geographical regions, each with its own distinctive features and chronological time-space. These regions are, (i) Baluchistan and its adjoining area in western Sind (7th to mid 4th millennium BC), (ii) Bannu Valley on hilly flanks of the Sulaimans, (iii) the plains between the Indus and the Kakra, along the Indo-Pak borders (iii) Northern, i.e., Kashmir Valley and the Pothwar Region (2500 BC - 1500 BC).

An view of the above time-frame will indicate that the Neolithic phase in Pakistan did not develop everywhere at the same time nor did it transformed into urban societies simultaneously. In fact, there were many Neolithic cultures which coexisted with hunter-gatherer societies on one hand the copper-using urban civilization (2600 BC - 1900 BC) on the other. These cultures, besides having different time-frame, exhibit some regional variations. For example, the ‘Northern Neolithic’ of northern Punjab and Kashmir was not only late on time scale but quite different from that of Baluchistan, Sindh, and Punjab in housing construction, artifact traditions, and subsistence basis. Pit-dwellings are the characteristic feature of the Kashmir Valley, and these are also reported from Sarai Khola in north-west of Punjab.

The Earliest Settlements: The earliest Neolithic sites in Pakistan include Mehrgarh, Killi Gul Muhammad, and Rana Gundai in Baluchistan; Gumla, Rehman Dheri, and Tarakai Qila in southern Pakhtoonkhwa province; and Sarai Khola in northern Punjab. Mehrgarh is the chief representative site where the excavations carried out by J.F. Jarrige and his team in 1970s and 1980s revealed a continuity in the growth and consolidation of village life which gradually merged with the urbanized Harappan culture in the third millennium BC. A transition from aceramic (pre-pottery) phase to handmade and wheel-turned pottery is also clearly marked here. Because of its cultural and historical importance, the archaeology of this site constitutes a full section in this volume; here only an outline is presented.

Mehrgharh is located in the Bolan valley in the northern part of the Kachi plain, near the point where the river emerges from the hills through the Bolan pass. The Bolan valley was an important link between the Indus plains and the mountainous valleys of north Baluchistan, and people and animals must have moved along this route from very early times. Excavations at Mehrgarh revealed the remains of ancient settlements scattered over an area of about 200 ha on a low mound and the surround



Rice was not ‘native’ to Pakistan, i.e. it was not a part of the original barley, wheat, goat, sheep, cattle, Noelithic package. Most likely it was introduced during the third

millennium BC through the Divide from India or probably through Swat from Turkestan

ing plain. Seven occupational levels were identified, giving striking evidence of continuous occupation and change over many millennia. The first six levels, i.e., Periods, are relevant for us here.

The earliest part of the settlement, the Period I, has been dated ca. 7000 years BC. The remains of Period I were located in an 11 m thick deposit at the northern end of the site, on the high bank of the Bolan river. The chronology of this phase is somewhat uncertain due to inconsistent radiocarbon dates. The majority of the dates fall between 6000 and 5500 BP (*ca*. 5000 BC, calibrated). The problem is that although Period I seems to have lasted for a very long time, most of the radiocarbon dates for the middle levels of Period I fall within the range of 5800 and 5530 before present. Furthermore, the excavators point out that there are also some much earlier radiocarbon dates-9385 ± 120 BP for Period IA; 7115 ± 120 BP for Period IIB; and 6500 ± 80 BP for Period III. This series of earlier dates has the advantage of providing a coherent chronological framework for the Mehrgarh neolithic sequence from the 8th to 6th millennia BC.
The people of Period I (this includes both Periods IA and lB) lived in houses made of handmade mud-bricks with small, rectangular rooms. One of the rooms at the lowest levels of Period I, measuring 2 x 1.8 m, had reed impressions on the floor and a grinding stone. The bricks used for house walls were of a standardized size, with distinctive rounded ends and finger impressions on their upper surface. Some of the structures divided into small units may have been granaries.

The stone tools of Period I included thousands of microliths, most of them based on blades. A few ground neolithic handaxes (celts) were also found. Some of the blades were set into wooden handles with a thick layer of bitumen and may have been used as sickles to harvest grain. Grinding stones indicate food processing. There were a few stone vessels and objects such as perforated discs and spatulae incised with a criss-cross design. Bone tools, including needles and awls, were also found, as was a handmade clay female figurine. Mehrgarh I was basically aceramic, i.e., it had no pottery; the

first few pieces of pottery appeared in Period lB.



Charred cotton seeds were discovered in the early periods of Mehrgarh, *ca.* Sixth millennium BC. Cotton fibers, embedded in a copper bead and probably a remnant of a string, was positively identified more recently, confirming the existence of cotton at and around Mehrgarh in that early time. It is, however, not known if it was cultivated or collected in the wild.

The people of Period I buried their dead in the open spaces between their houses. The bodies were placed in oval pits i.n a flexed (bent) position. The bones were often covered with red ochre, suggesting some sort of fertility beliefs. In at least two burials, young goats had been placed near the feet of the body. Grave goods included bitumen-lined baskets and food offerings, and ornaments such as necklaces made of stone or shell beads, bone pendants, and anklets. A copper bead was found in one of the burials. The occurrence of turquoise and lapis lazuli beads is especially interesting. The lapis lazuli could have come from the Chagai hills in north Baluchistan or from Afghanistan. Turquoise could have come from eastern Iran or central Asia. The nearest source of marine shells is the Makran coast, about 500 km away. The presence of such items in the graves indicates that the people of Mehrgarh were engaged in some amount of longdistance exchange.

Period II at Mehrgarh, dated *ca.* 6000-4500 BC, is divided into three sub-phases - A, B, and C. The size of the settlement increased during this period and there were several mud-brick structures divided into small cell-like compartments. Some of these may have been houses, but others may have



The earliest evidence of agricultural life based on wheat, and barley, in Pakistan and the rest of the subcontinent comes from the site of Mehrgarh on the bank of the Bolan river in the Kachi plain of Baluchistan.

been used for storage For instance, double rows of small rooms with a passage in between, with barley seeds on the floors, may have been used to store grain. The stone and bone tool types of Period I continued. There were two sickles made of microliths hafted onto a bitumen matrix. P Vaughan's microwear study of stone tools found in an area of Period IIA indicates that most of them were connected with the working of animal products-activities such as butchery, cooking, hide

process- ing, and the making of bone artifacts. Small amounts of handmade pottery occurred in the early part of Period II and wheel-made pottery appeared in Period lle. In Period llB, a copper ring and bead and a small ingot of copper were found. Other finds of Period 11included an ivory tusk, pieces of red ochre, grinding stones, and a small unbaked clay figurine of a male torso. There were two flexed burials, the bodies covered with red ochre, unaccompanied by any grave goods.

Mehrgarh III belongs to the second half of the 5th millennium BC and is chalcolithic (that is, the use of copper has started to make tools, although the stone remained the main raw material). There is evidence of a significant increase in craft activities, including large-scale production of wheel-made pottery with painted decorations, marked by innovations and refinement in pottery-making techniques. A pottery-manufacturing area was found, where the bases of three ovens were exposed on top of an accumulation of 6 m of pottery debris. The frequent occurrence of ornaments such as necklaces and bracelets made out of tiny steatite beads indicate that bead making was another important craft. There were also beads of semi-precious stones such as lapis lazuli, turquoise, and agate, as well as of terracotta and shell. Stone micro-drills may have been used to make engravings on shell. There were a few terracotta humped bulls. Terracotta crucibles with traces of copper suggest the beginning of metallurgy.

Period III had storage complexes divided into compartments, similar to those of earlier phases. A large cemetery containing the burials of about 99 people shows changes in burial practices. The niches walled in by cigar-shaped bricks, known in Period II, were absent. The heads of some of the skeletons were placed on bricks. There was one


Barley was probably the first staple grain used by the Indus people in Baluchistan

collec- tive burial with two wheel-made painted pots as grave goods (pots are not found in any other burial). In another burial, a copper or bronze object that looks like a fragment of a segmented seal was found near the skull. Ornaments, mostly made of steatite micro- beads, occurred frequently among the grave goods. There were also pendants of lapis lazuli, carnelian, turquoise, chrysoprase, agate, terracotta, and seashell.

The most remarkable aspect of Periods I-Ill is that they provide the earliest and most comprehensive evidence of subsistence activities in the region, revealing the transition from hunting and food gathering to a heavy reliance on animal domestication and agriculture. Thousands of plant specimens were collected in the course of the Mehrgarh excavations. These included charred grains and seeds as well as impressions of grain on mud-brick. Barley seems to have been the most important crop. In The fact that wild, transitional, and domesticated varieties of barley were found at the site proves that

north Baluchistan fell within the natural habitat zone of wild barley and that Mehrgarh was part of a large nuclear area of barley domestication

Wheat was another important crop. Grains of domesticated hulled einkorn wheat *(Triticum monococcum),* emmer wheat (Triticum diococcum), and naked wheat (Triticum *dunlm)* were found in Period I. In later periods, a large proportion of the wheat grains belonged to the *Triticum sphaerococcum* variety. Whether Mehrgarh fell within the natural habitat zone of wild wheat is a matter of debate, as no clear evidence of wild wheat has so far been found in the area. But there is no doubt that the people of Mehrgarh were domesticating this cereal. Seeds of *ber (Zizyphus jujube)* and dates *(Phoenix dactylifera)* were also found in Periods I and II. In Period II. In addition to barley and wheat, there were numer



A show-case *Zebu* bull from Pothwar. Zebu cattle was most likely domesticated in Baluchistan or western Sindh from where it spread westward to the Middle East and Europe.

ous seeds of cotton *(Gossypium* sp.) found in a hearth. Period III showed continuity with the earlier period, but also a diversification of agriculture. Two new varieties of wheat *(Triticum aestivum compactum, Triticum aestivum sphaerococcum)* and one of barley *(Hordeum hexas- tichum)* and a new cerealoats *(Avena* spJ-were identified. Wheat had become more important than barley.

Not much is known about the methods of cultivation practiced by the neolithic and early chalcolithic people of Mehrgarh. Farmers must have relied on winter rains and may have channelized water into their fields by building mud or stone embankments similar to the *gabarbands* made in the region today. Stone sickles made by hafting tiny microliths onto wooden handles with bitumen must have been used for harvesting grain.

Neolithic Mehrgarh gives clear evidence of the transition from hunting to animal domestication. The lower levels of Period I were dominated by the bones of wild animals - deer (mostly gazelle, but also some blackbuck, *sambar,* and *chital), nilgai,* goat, onager (wild ass), water buffalo, cattle, pig, and perhaps elephant There is also evidence of domesticated goats, and the decreasing size of sheep and cattle suggests that their domestication too was underway. By the end of Period I, the frequency of bones of gazelles and other wild animals had drastically decreased, while those of domesticated cattle, goats, and sheep had greatly increased. Cattle were now the most important do- mesticated animal. In Period Ill, cattle still dominated, but there was an increase in the proportion of sheep and goat bones. Interestingly, Period III also showed an increase in the number of bones of wild animals, suggesting resurgence in hunting activity.

J R. Lukacs' study (1985) of the human dental remains shows a low rate of dental caries (cavities) in the early levels. This may have been due to the high fluoride levels in the drinking water available in the area. Other features of the teeth suggest

that people had a coarse diet There is evidence of tooth probing (people poking their teeth either to sooth pain or pry out food). Dental health declined in Period Ill, and this may have been due to changes in food habits, for instance, the consumption of more refined foods.

The evidence from Period IV onwards shows a further expansion of the settlement, diversification of agriculture and crafts, and more and better decorated pottery. In Period IV,there were larger structures, with rooms separated from each other by wide walls and doors with wooden lintels. One door, only 1.10 m high (people must have had to bend down to go through) led into a room crammed with many objects such as stone flakes, blades, grinding stones, pestles, and many bones.

Other items found in this room included a storage jar, a crushed basin with ridges and snake designs painted on the inner side, fine goblets, and beautifully painted vessels The pottery of Period IV included polychrome wares. A new style of terra cotta female figurines with a tubular body, pinched nose, and joined legs made its appearance There are continuities in pottery designs between Periods IV and V. In Period VI, there were some changes - the appearance of a red ware decorated with pipal leaves, and a well-fired grey ware. A large pottery kiln was found in Period VI. A distinctive feature of this period are terracotta female figurines with elaborate hairstyles, and heavy breasts, which may have had a cultic significance. Several large mounds in the Kachi plain may represent unexplored sites contemporary to the later periods of Mehrgarh.

The Bolan pass leads from Mehrgarh into the Quetta valley, where there are a number of sites. Today, farmers of this valley compensate for meagre rainfall by using water drawn from wells and streams to irrigate their fields. Kili Gul Muhammad and Damb Sadaat are two of the important excavated sites in this area. Kili Gul Mohammad is about 3.2 km from Quetta city, on the banks of the Hannah river. The mound is a small one - about 90 x 55 m. Walter A. Fairservis (1950) conducted a small excavation over a 3.5 sq m area up to a depth of 11 14 m, reaching natural soil. The excavation revealed four periods of occupation. Radiocarbon dates from the upper levels of neolithic fall between *ca.* 5000 and 4500 BC, but the beginning of the settlement could go back to *ca.* 5500 BC, or even earlier. There was no evidence of pottery at this stage. Bones of domesticated cattle, sheep, goat, and ass were found. There were no cereals, but two sickle blades were discovered.

It is highly likely that the piedmont areas along the Sindh Kohistan and Kirthar Range also have sites of these early phase of human settlement, possibly associated with the *nais* and springs of the region. One site, Tharro Hill, which may have been occupied during this period of time, is located near the active course of the Indus River and could indicate the early penetration of food producers into this complex environment.

Although no direct evidence has come forth so far, the site of Gumla at the confluence of the Gomal and the Indus rivers near Dera Ismail Khan may be another site of this nature. Surface remains indicate the early Neolithic developments in the mound of Periano Ghundai near Fort Sandeman on the northeast and in the heart of the great mound of Dabar Kot, far to the southeast in the district of Loralai. The evidence of very early settlements have also been found at the site of Rana Ghundai and in the little mound of Sur Jangal. De Cardi identified this early phase in the northern part of southern Kalat at the site of Anjira, and its latest periods are represented probably in the very earliest levels of Mundigak in southern Afghanistan. This distribution suggests a northern connection of early food producers, and this may well be true.

Baluchistan, or any other region in Pakistan, has so far revealed no settlement that arose without the

presence of agriculture. There is no evidence of sedentary living without agriculture in Afghanistan and Turkmenia either. But, it does not mean that sedentary communities did not or could not exist in this relatively dry region without agriculture. Examples of sedentary communities in other neighboring areas of limited vegetation are available. For instance, Biagi and Nisbet (21) , examined the aceramic fisherhunters of prehistoric Oman, citing eight indicators of sedentism: site distribution, well-defined structures, recurrent structure alignment, non-local tree species, floral remains, faunal remains, cemeteries and evidence for workshop-level production of goods including beads, earrings and fishhooks. Settlements without agriculture are, of course, wellknown in the Levant and have been described in detail in Section II of this volume. Several small settlements without agriculture have recently come to light in Sindh. They have been described elsewhere in this book.

The early settlements in selected areas of Baluchistan continued to grow in number as well as in size and sophistication. There was an expansion of agricultural villages over a wide area of Baluchistan and the Kachi plain. This ensuing time period we may call the stage of mature agricultural villages or village farming communities. During this time we observe the development of settled agricultural villages in Baluchistan and the adjoining areas of Sindh. We also find the same type of evidence in Afghanistan, both in the Kandhar area as well as in the Balkh region. In all probability, the vast area to the west of Pakistan was in full partnership with Pakistan in parallel animal husbandry, There is, however, no such evidence from India. Until positive evidence is available to prove it, we must assume that during all this time there was no settled agricultural communities east of the Indus region and that this region was still populated by Stone Age hunter-gatherers and leading a nomadic life. development in

technology, and agriculture, sedentism.


Before the harvester there was the sickle.

Changes in Material Culture: The Neolithic cultures in Pakistan, like those in many other regions of the Old World, must be viewed as a process of transition from hunting and foodgathering to herding and food producing within the context of a sedentary way of life. Although, as stated earlier, this transition did not appear simultaneously in different regions of the country and although it was not uniform in all respects, the evolving Neolithic cultures exhibited a considerable degree of commonality among themselves. For example, the Neolithic people used well-polished and ground

axes and adzes called 'celts,' but the microlithic blade tools of the preceding Epipaleolithic phase also continued to be utilized.The domestication of animals and cultivation of cereals by the Neolithic folks is evident from the discovery of charred pieces of grain and animal bones. The presence of querns, mullers and storage jars also suggests the same. This period marks the beginning of the use of pottery which was largely handmade, coarse and initially ill-fired. The evidence of wattle-and-daub hutments leaves no doubt that it was a sedentary way of life.

The previous tool making technology of working flints and stones continued but the artifacts now exhibited more sophisticated techniques. Man came out of the natural dwellings, such as caves and rock shelters, if there were any, and started to live in straw huts built in the open. He also began to build more permanent structures, first with cobble stones, then with clay mixed with straw and still later with sun-dried bricks. By early 7th millennium, we find the Indus man on the path of “caves-tovillages” and by 5th millennium BC, almost the whole western region from Las Bela in southern Baluchistan to Bannu in the Pashtun country witnessed the development of agriculture, animal herding and settled communities. Also associated with permanent or semi-permanent settlements were a series of new crafts involving important technical discoveries. Among these were the innovations in tool making, the manufacture of pottery, however crude and however basic, and the development of decorative art. Archaeological evidence is uneven but it is there.

Precious items found in the graves of Mehrgarh and other early Neolithic sites provide evidence for the existence of a network of longdistance exchange even during this formative period. There were beads made of turquoise from Persia or Central Asia, lapis lazuli from northern Afghanistan and shells which must have come from the coast 500 kilometers away. The rise of handicraft is clearly in evidence, the most important of which is basket weaving from reed and grass. These baskets were sometimes lined with bitumen to make them waterproof. Handmade pottery appeared. It was soon followed by another type of pottery where woven baskets were used as molds. Firing of pottery also ensued.

Man has started to build houses with multiple rooms, using mud and mud-bricks of regular size which were made without moulds. Storage rooms for grain are strongly in evidence, pottery makes its appearance although it is hand-made and rather crude. The so-called Basket-marked pottery is of special interest and an ingenious innovation. Here, the woven baskets were used to mould pottery and later fired to burn the basket moulds. This technique is indicated by the basket imprints on this style of pottery. Crafts, especially bead-making, are present, the stone tools consist of microliths as well as polished implements, and composite tools make their appearance.

The early inhabitants of Mehrgarh took some care for their dead. There may even be some glimmer of social differentiation among the interments. Most of the evidence for long-distance trade comes from these burials. These far reaching contacts are indicative of the fact that the early settlements of Baluchistan were not small, parochial affairs, stuck in the narrow rut of their own surroundings. On the contrary, these people were engaged in contacts with the people around them and the more distant neighbors. The great engine of these contacts was almost certainly nomadic pastoralism.

It becomes obvious that a homogeneous "neolithic culture" did not exist in prehistoric Pakistan, nor can theories of mass migrations of mysterious new "races" be justified. Rather, the emergence of food production strategies was a gradual transition that took place in different localities at different times over a period of several millennia. On one hand we have distinct evidence of agriculture and

animal domestication as early as 7000 BC, on the other hand we see the hunter-gatherers of the Bannu plains and other northern areas engaged in the stone age life as late as the fourth millennium BC. Similarly, while we observe the subsistence economy of western Sindh mostly dependent on cultivation of crops in the fifth millennium BC, the populations of eastern Sindh and Cholistan seemed to thriving mainly on pastoralism and seed gathering. An ecological and climatic shifts with modification of landscapes is in evidence but it is not clear whether it was due to human activities or the natural agencies. Concurrent with these cultural and environmental changes arose new sources of survival stress that biologically affected human populations, as can be documented by the scientific study of skeletal remains from a variety of burial sites.

Domestication of animals, especially sheep, goats, and cattle, developed hand in hand with the cultivation of barley and wheat. Although these settlements clearly depended on agriculture and animal husbandry for their subsistence, the archaeological evidence points to the fact that the inhabitants of these early settlements practiced hunting and gathering as well. The presence of date and Jujube (*ber)* stones and the bones of wild animals mixed with those of domesticated animals in early strata at Mehrgarh is the evidence. Similarly, sendentism became the norm but nomadism still persisted. There is strong evidence that settled communities coexisted side by side with nomadic pastoral communities in a symbiotic relationship. This pattern of subsistence persisted to even modern times in some areas of Pakistan.

An important finding from this stage is the nature of animal domestication. Without any doubt, these early settlers domesticated the local breeds of goats and sheep that were present in the wild. The same reading applies to the domestication of cattle as the humped cattle was indigenous to only this region. Domestication of water buffalo probably was undertaken within this period but definite evidence is not available. More and more data is becoming available that indicate that barley was indigenous in this area and probably wheat too. Thus, there is a good probability that these plants were domesticated locally, instead of the diffusion from the Middle East. If it is true, then Pakistan was indeed at the epicenter of animals and plants domestication zone in league with the Middle East.

The variations in different Neolithic Cultures, as indicated above, suggest that each of them was conditioned by its own geographical setting, and therefore they need to be studied separately. It must be mentioned, however, that with all their diversity in terms of time, space and local features, the net result of the Neolithic cultures, wherever they developed, was broadly the same, i.e., the rise of farming and sedentary village communities.

These developments were largely an indigenous in character and origin but in some cases it might have received stimuli from outside contacts with neighboring Neolithic communities, especially from the west of the borders beyond Iran. In other cases, of course, the Neolithic man of the Indus valley must have influenced the developments in those areas in reverse direction. This interaction formed an important part of the neolithic transition in ancient Pakistan and the area that lies to its west and the northwest.

It is interesting to note that certain traits of the early Neolithic period of Baluchistan appear to be shared by the apparently later Neolithic adaptations wherever such settlements have been found. This suggests a strong continuity from the Mesolithic transition to early settlements and then to the next stage of development, that is was peopled by Paleolithic and Mesolithic hunting-gathering. Despite number of Indian archaeologists of recent times, no evidence of organized agriculture and permanent

villages has so far been found. All over the country we observe nomadic pastoralists, some groups living for extended periods of time in semi-fixed pastoral camps.

Developments in the Borderlands: The process of adaptation to environment, discussed above in context with Baluchistan, can also be seen taking place over much of West Asia and to some extent of Central Asia and Afghanistan from about 7,000 BC onward. Domestication of plants and animals was well in progress and small permanent settlements were being established throughout Near East even earlier. These primary settlements supplemented their food by producing it through agriculture and animal husbandry. Although no evidence of permanent settlements in Afghanistan is available beyond Kandhar, there are unmistaken signs for the existence of domestication of goats and sheep in northern Afghanistan. Dupree conducted small-scale excavations at the sites of Snake Cave (Aq Kupruk I) and Horse Cave (Aq Kupruk II) on the Balkh River innorthern Afghanistan. Horse Cave has evidence for domesticated sheep and goats at ca. 10,000 BC. This evidence is corroborated by the evidence from Snake Cave, where communities living by frantic attempts by a there is evidence for domesticated sheep and goats at *ca.* 7500 BC. These dates are earlier than Mehrgarh as well as the Near East, the so-called 'cradle of civilization'. The available carbon dates place the neolithic of Turkmenia in the sixth millennium BC. which correspond well with those of Mehrgarh and Kili Gul Muhammad, the two earliest Neolithic sites in Pakistan.

It is well possible and in fact likely that at some places where bones of domesticated animals have been found, barley was cultivated or at least harvested. In all appearance, the whole of the Iranian Plateau, especially its fringes, was proceeding toward the cultivation of barley, the domestication of sheep and goats, and establishment of permanent settlements or seasonal pastoral camps. It is not possible yet to ascertain the absolute chronology of these developments or even a relevant chronology in relation to the developments in Baluchistan. Nevertheless, it is a general belief among archaeologists that most of these regions were walking towards the Neolithic in unison with each other. If there was difference in the pace of their progress, these areas were most likely not more than a millennium behind Baluchistan or a millennium or two ahead of Baluchistan.

The Process of 'Neolithization': What processes, then, were involved in the replacement of an Epi-paleolithic by a Neolithic way of life in Baluchistan and the Greater Indus Region generally? Was it, as the hypothesis of the Neolithic Revolution might suggest, that the new way of life was carried as a package from the Near East? Could it, to go to the opposit extreme, have been generated autochthonously among the Mesolithic populations of Baluchistan and western Sindh? Or, was it, as one might prefer to believe, the outcome of the interaction between the indigenous population and exotic influences introduced at least in part by some newcomers? That such an interaction was at any rate possible is suggested by the fact that from a cultural standpoint the Epi-paleolithic inhabitants of South-West Asia and Central Asia, Afghanistan and northwest Baluchistan were significantly close. They shared the same Upper Paleolithic ancestry and, not surprisingly, many of the same attributes. Thus, the aceramic farmers of Palestine, Kurdistan and Iran, notably at Jarmo, made flint industries with a strong microlithic component, resembling southern Merhrgarh and Jarmo tell a similar story. The barbless fish-hook and the barbed spear-heads of the Natufian, for example, compare closely with those found in neolithic Pakistan. Even the device of fixing flint blades into the slotted handles of reaping knives or sickles used by the earliest farmers of south-west Asia had apparently been invented in Upper Paleolithic elsewhere and was widely applied to knives and projectile heads in Mesolithic assemblages of a large geographic area, ranging from northern Europe to the Indus Valley.
those of Epi-paleolithic

Pakistan. Bone artifacts industries in discovered at The UNESCO-sponsored volume on the *History of Mankind*, written by some wold's renowned archaeologists, teaches us that: "At least it can be said that there is no longer any serious doubt that the earliest centers for both agriculture and stockraising lay in South-West Asia, well within that Eurasian theatre that has seen all man's leading

initiatives since the beginning of Upper Paleolithic times." This statement represents a well-accepted point of view for the origins of civilization and has lately transformed into an archaeological dogma. Well, our knowledge about the Neolithic in other parts of the world has since advanced quite a bit and this Eurocentric position is being increasingly challenged. We shall come to these arguments in Chapter IV.2.

One of the main arguments favoring the hypothesis that the Neolithic way of life, which supplemented and replaced the Mesolithic over extensive parts of Europe in the west and the Epipaleolithic in the Greater Indus Valley in the east, stemmed wholly from the Near East was that the animals and plants on which its underlying economy was based were without exception domesticated there, and must therefore have been introduced to their new habitats. Recent opinions on the subject, however, take exception to this view. First of all, the hypothesis that the earliest domestication of plants and animals happened in those areas where the wild progenitors of domesticated plants and animals abounded, has been challenged. There is increasing evidence that domestication happened on the margins, rather than in the center, of the areas of the wild progenitors.

Secondly, it has not yet been proven that the domesticated plants and animals common in the Middle Asia, ranging from the Mediterranean to the Indus Valley, were in fact the descendants of the wild progenitors that were present in the Near East and nowhere else. Even the genetic studies undertaken in recent years have failed to establish such a link conclusively.

Thirdly, there is no guarantee that the geographic distribution of the supposed wild progenitors in today's environment was the same as that in the post-Pleistocene. Likelihood is that probably it was not. Fourthly, and probably the most importantly, most of the research work has been done in the Near East only, at the expensed of other but related areas. For example, the presence of wild barley has been proven without any doubt all the way from the Levant to the far reaches of the Himalayas, including Afghanistan and Baluchistan. In spite of this evidence, no attempt has so far been made to see if this wild plant could possibly be a progenitor of the domesticated barley discovered at Mehrgarh and other such sites beyond the Nears East. Similarly, the ancestors of emmer wheat, apparently one of the cereals first to be cultivated, has a wide range from Palestine to Persia and Afghanistan all the way up to Pakistan, even to Tibet.

The Asian mouflon sheep, the ibex and the urial seem to have been the precursors of the earliest domesticated herds; their area of spread is equally large and wide-spread all the way from eastern Turkey to Pakistan. It seems that the fringes of the Iranian Plateau, especially a few nodes in the hilly flanks of the mountain range bordering Iran and Iraq, similar outward slopes of the Alburz mountain range bordering Iran and Turkmenia, and the Kachi plain on the eastern end of the Plateau in Baluchistan are more important than any one 'cradle' of agriculture.

The food producing tradition of the peoples of the Greater Indus Region is associated with the uplands of the Iranian Plateau and Afghanistan and is based on the wheat/barley and sheep/goat/cattle constellation of domesticated plants and animals. This is clearly related, in some yet to be understood ways, to the larger Near East pattern of early food production. It should not be interpreted as a

certainty that there was a diffusion of farming and herding from the Near East to the Greater Indus Valley and onto the Indian peninsula. But, the plants and animals used by the peoples in Afghanistan and Pakistan were much the same as those used on the Iranian Plateau, extending all the way to the Mediterranean Sea and beyond.

The early centers of agriculture in West Asia and the Greater Indus Valley were certainly not in the flats of the great rivers of the Tigris and Euphrates or the plains of the mighty Indus where agriculture was later to come to full fruition. A consensus is, therefore evolving according to which the centers of agriculture should be sought in ‘hilly flanks‘ of the Iranian Plateau. This could be the southern Caspian basin or the high Anatolia and farther Iranian plateaux, even the trans-Caspian and Baluchistan. According to this view, these centers should be sought along the western parts of Iran, eastern end of the Mediterranean from Palestine and western Jordan, through Lebanon and Syria to southern Turkey, southern Turkmenistan, northern Afghanistan and Baluchistan. Palestine was certainly very much involved in this momentous revolution but it is not the only region for such a consideration. These issues will be further examined in the ensuing discussion.

The existence of domesticated animals in the Blakh region of Afghanistan during 7,500-10,000 BC, mentioned above, does not prove the existence of agriculture and in no way indicates the existence of a sedentary lifestyle in the region, but these discoveries may be a telltale sign of something important and should not be dismissed simply because they challenge the dogma of the Near-East as a ’nucleus zone’ for the domestication of barley, wheat, cattle, sheep, and goats as well as the development of primary village communities. The importance of the evidence lies in the realization that innovations leading to the domestication of animals and plants, in human subsistence practices, and the evolution of sedentary living were also taking place in areas other than the Near-East. This realization directly ties up with more and better data on the early domestication of plants and animals that led to sedentary lifestyle and the establishment of primary village societies in Baluchistan, as discussed in the next section of this book in considerable details.

The above discussion is not to prove the priority of one place over the other for the ‘origin’ of agriculture and domesticated animals. It is merely to show that the primacy of the Near East for the origins and spread of the Neolithic culture should not be taken for granted and even the ‘revolutionary’ character of this change should not be subscribed to without the examination of the relevant evidence.

Given the predominance of evidence in favor of the Near east at the present time and given a severe lack of research in Iran, Afghanistan, central Asia and Pakistan, the fact remains that the essence of the farming economy has a whiff of southwest Asia. Another way of looking at the situation is to consider the whole area ranging from the Mediterranean to the Indus Valley and from the Levant to central Asia as one interaction zone in which people of different sub-regions freely interacted with one another, exchanging goods and ideas. This exchange also applied to the methods of agriculture but also to the exchange of seeds and stock animals. According to this scenario, we are in fact dealing with an ‘expanded core area” (26), expanded to an extent that one wonders what is the ‘core’ and what is the ‘periphery’. More on it in Chapter III.5.

Conclusion: We began this section by asserting that the nineteenth-century division of the Stone Age into two stages, the Paleolithic and the Neolithic, created a barrier to a just understanding of the course of prehistory. We then went on to review some of the results that have followed from

recognizing that 'gap' between the Paleolithic and the Neolithic was equally illusory and that the Stone Age was in reality a continuum. This was first done in relation to the recently discovered Epi-paleolithic settlements of hunter-gatherers in the Levant, and then to the origins of economies based primarily on cereal farming and stock-raising in Baluchistan, northern Afghanistan, and Central Asia.

In the present chapter we have seen the evidence for the varied ways in which settled Neolithic cultures developed in different parts of Baluchistan and compared them with those contemporaneously developing in South-West Asia, Afghanistan and Central Asia. Although the evidence has been meager but the discovery of Mehrgarh and the decade-long archaeological research at this location have provided us with ample evidence for the progression of the Neolithic culture in this area. Kili Gul Muhammad, Gumla, and some other but uncertain locations provide us further evidence. The archaeological evidence for the spread of agricultural villages within Baluchistan, Sindh, and Hakra region is much stronger as the forthcoming chapters will show.

We must recall that the prior existence of groups who lived by hunting and collecting and by various sorts of pastoral nomadism continued. These nomadic pastoralists lived in portable shelters, probably not unlike the tents of the modern nomads of the Pashtun country, or the temporary huts of light wooden frames, matting and thatch, still constructed in many parts of Baluchistan to this day. Evidence of huts of this character was obtained recently in the excavations at Lewan, near Bannu, a fourth millennium site.

At the close of this period there was already developed mud-brick architecture, wheat and barley were cultivated, cattle, sheep and goats were herded, and hand-made pottery appeared in almost all of these settlements. Microlithic tools have been found in abundance at these sites, some of which set in composite implements such as the sickle and the saw. Polished stone tools and those made of bone are also in evidence but there is no trace of metal. Some of these aspects of this overall culture constitute separate chapters of this book where some additional details are provided.

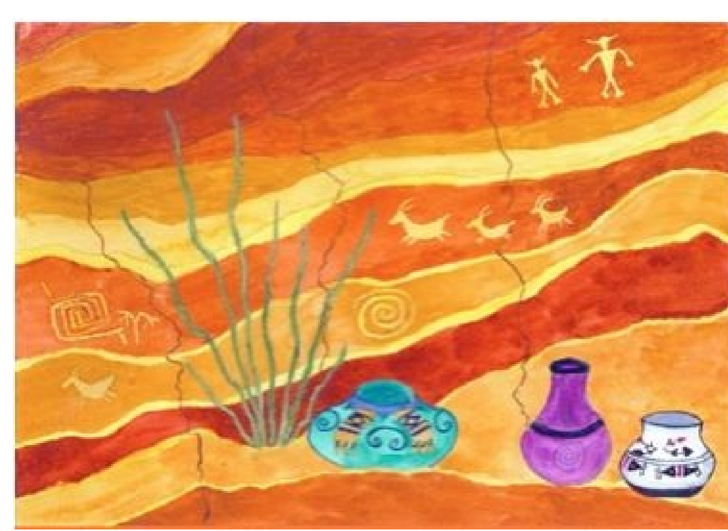
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SECTION III

The Origins of Agriculture and Animal Husbandry



III.0. Origins of Agriculture and Animal Husbandry



There are a handful of major events in human prehistory that drive much of archaeological research. The origins of our earliest ancestors, the appearance of modern humans, the transition to agriculture, the rise of hierarchical society, and the emergence

of urban living are among the most important. Of these, the transition to agriculture is perhaps the most remarkable event in the entire course of human prehistory.

Two and a half million years is a conservative estimate for the time of humans on earth. For virtually all of that time we humans were gatherers and hunters, dependent on wild plants and animals
- the bounty of nature. Yet for some reason, beginning around 10,000 years ago hunter-gatherers became farmers in a number of different places on the planet. The intentional cultivation of domesticated plants was an almost simultaneous yet entirely independent development in Middle Asia (Southwest Asia, Central Asia and Pakistan), China, Southeast Asia, and Mesoamerica, transpiring within a period of approximately 5,000 years or less.

Fundamental changes in human societies occurred with the emergence of agriculture. Changes occurred in social organization and cultural ecology.The development of agriculture brought profound changes in the relationship between people and the natural world. Archaeologists have usually theorized that, with the invention of farming, people were able to settle down and increase the amount and reliability of their food supply, thus allowing the same land to support more people than by hunting and gathering, allowing our species to multiply throughout the world. The ability to

produce food and other products from domesticated plants and animals surplus to immediate subsistence requirements also opened up new pathways to economic and social complexity: farming could mean new resources for barter, payment of tax or tribute, for sale in a market; it could mean food for non-food producers such as specialist craftworkers, priests, warriors, lords, and kings. Thus farming was the precondition for the development of the first great urban civilizations in Egypt, Mesopotamia, the Indus valley, China, the Americas, and Africa, and has been for all later states up to the present day.

As agriculture involves relationships with animals and plants, the remains of these organisms provide us with our most direct evidence for the origins of agriculture and animal herding, and their effects on the emerging culture. There is a growing body of archaeobotanical and archaeozoological data from all over the world that is contributing to an evolving synthesis of the Neolithic cultures in the Old World. The discussion in this Section considers the state of the evidence, including its reliability, and summarizes its broad contours. Details of the evidential basis are left out as these can be found in reviews of archaeobotany and archaeology, some of which are listed in the Bibliography at the end of the book and others are referred to throughout the text.

The origins and spread of agriculture has been vigorously debated for the past entire century, even longer. This is still a favorite topic of research among many archaeologists and biological scientists. Some regions are considered candidates for hearths of pristine origins through the domestication of native species while other regions must have received agriculture and animal husbandry secondarily, either through migration (demic diffusion) or adoption (cultural diffusion). In distinguishing these possibilities, we must inevitably move beyond the archaeozoological or archaeobotanical evidence and place it in its wider archaeological context. For both pristine origins and secondary origins it is useful to consider how the Neolithic package came together in terms of timing, ordering and association. As outlined by Childe we should consider the Neolithic in terms of both animals and plants, ceramic production and sedentism but our main focus here would be on the evolution (or the revolution) of food production and its spread throughout the populated earth.

The complex relationship between archaeological theory and practice has been one of the most important features of research on the beginnings of farming. The archaeologist going into the field is asking particular questions about the past, questions which invariably reflect the general theoretical frameworks pervading at the time. The questions being asked affect the kind of methodologies used in the field, prioritizing the recovery of certain classesof information over others. New theories will pose new questions about past societies, and these questions will result not just in reinterpretations of existing data but also in new kinds of data being collected in the field or the laboratory. New data, whether searched for explicitly or thrown up by unexpected discoveries, feed back into theoretical frameworks. As described in the rest of this chapter, how archaeologists have thought about foraging and early farming societies has had a fundamental impact on the questions they have asked about why people became farmers, the kind of data they have collected, how those data have been interpreted, and the general theories proposed as a result

Starting with the first chapter, which discusses the domestication of plants and animas on a global scale, we follow the course of these developments and witness the transformation to some rudimentary agricultural villages which were the precursors of the urban civilization that followed. It is by no means a linear story but we now have sufficient material at our disposal that a more-or-less coherent story can be told. Thanks to an intense level of research in South-West Asia (the Near East)

and some patchy work in Central Asia and Baluchistan, we have a sound basis to extrapolate the archaeological data and correlate the results with whatever we have for the Greater Indus Valley.

Some theoretical questions connected to the Neolithic and the beginning of agriculture are as important as the facts on ground. We discuss a few aspects of this enquiry to wrap things up by reviewing some of the competing explanations for the origins of food production. This will give us a sense of the diverse perspectives from which researchers investigate how and why farming developed after the end of the last Ice Age. The questions of how, when, where and why people first domesticated plants and animals, and abandoned the foraging life for that of farming, are central to an understanding of the history of humanity.

III.1. Domestication of Plants and Animals



This chapter deals with the domestication of plants and animals that formed the basis of agriculture and pastoralism in the Neolithic world. It is a general discussion of the subject in which the South-West Asia figures quite prominently. Much of this review is devoted to domestication itself: its origins, the biological changes involved, its surprising restriction to so few species, the restriction of its geographic origins to so few homelands, and its subsequent geographic expansion from those homelands. There are some theoretical questions but that discussion is deferred to a separate chapter in this Section. The present chapter should be considered as an introduction to the next one as the domestication of plants and animals naturally leads to the beginning of agriculture and pastoralism.

By a domesticate, we mean a species bred in captivity and thereby modified from its wild ancestors in ways making it more useful to humans who control its reproduction and (in the case of animals) its food supply. Domestication is thus distinct from mere taming of wild-born animals or taking care of a wild flowering plant. It involved removing plants and animals from their natural habitat, a process of selective breeding and rearing under human control for purposes of human gain. The domestication of animals and plants was the outcome of a long series of collective experiments involving many generations of men, women, and children, stretching out over hundreds, perhaps thousands, of years. We will never know the identities of the people who took part in these experiments and made the critical choices and changes in their strategies of obtaining food. But the processes they set in motion marked one of the greatest achievements of humankind. Archaeological evidence records a fairly late stage in the story of animal and plant domestication, when it was already well underway. Although many details of these processes still elude us, it is possible to reconstruct various aspects of the transition from hunting-gathering to domestication in different

parts of the world.

It seems fairly certain to us now that domestication of plants and animals started independently in several places at different times. Evidently, only certain groups of wild plants were involved in domestication, and Harlan and de Wet (148) show that certain families of plants, especially the grasses (such as barley and wheats) and legumes (beans, peas, pulses, etc) have contributed many major crops; and many others have produced no important crops at all.

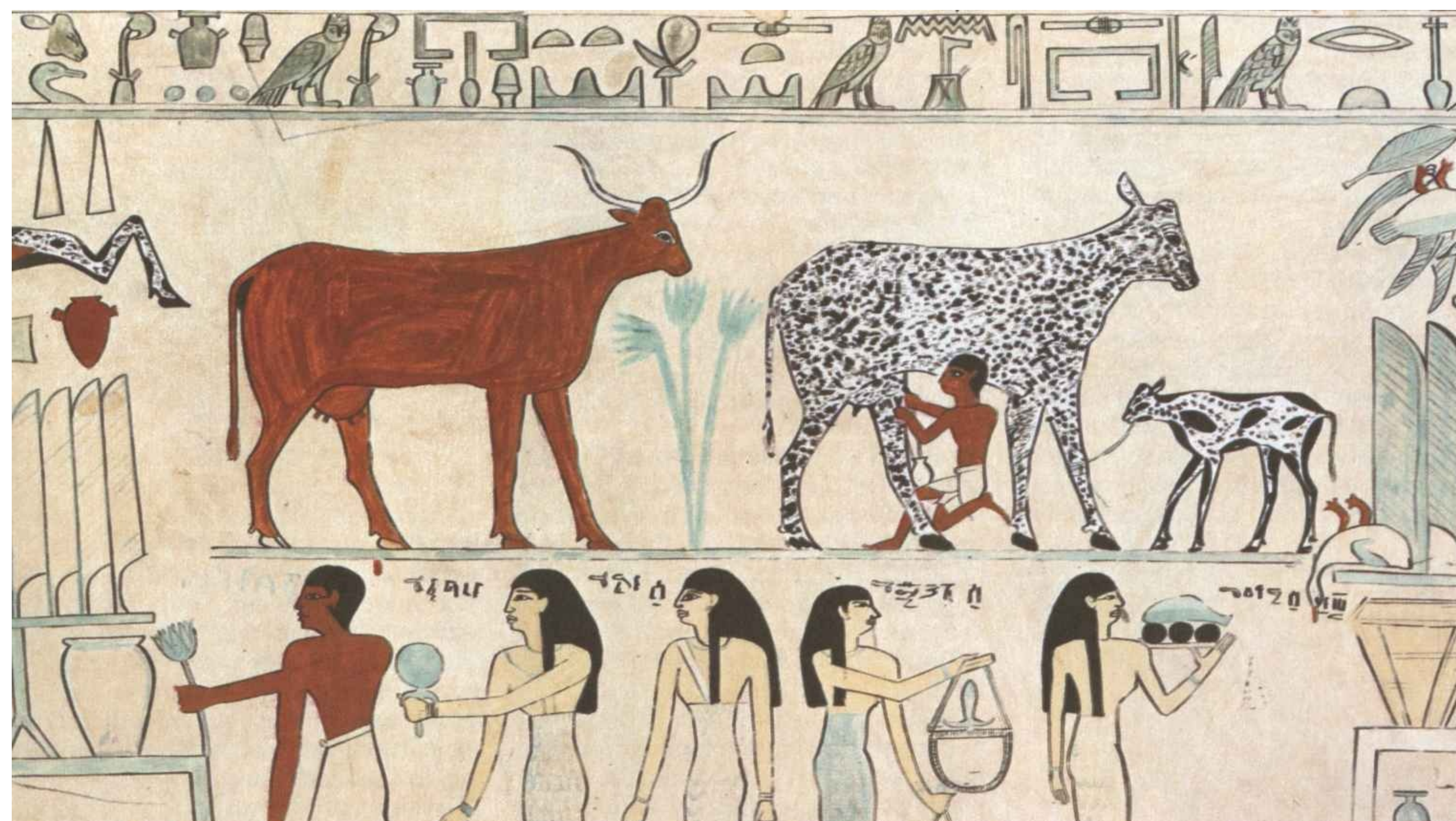
Then again, crops have originated in certain parts of the world as was first pointed out by de Candolle: "Agriculture came originally, at least so far as the principal species are concerned, from three great regions, in which certain plants grew, regions which had no communication with each other. These are - China, the South-West Asia , and intertropical America." At a later date Vavilov considerably enlarged on this point by showing that all the major crops originated in the tropical to subtropical regions of the world, and in some eleven or twelve centers of origin, based on his concept that centers of diversity could be equated with centers of origin. Although he added further that the origins of plant domestication were to be found in mountain zones in these centers modern research gives some indication that this was probably an over-simplification. We shall return to these points later, but for the moment we can establish quite clearly that cultivated plants arose from a rather restricted number of plant families and in a rather restricted area of the globe. This does not imply, however, that man did not *utilize* all kinds of plants in every area in which he lived. Quite the contrary. All archaeological and ethnobotanical evidence shows clearly that both primitive and relatively advanced peoples have gathered and eaten or otherwise utilized all manner of wild plant products from time immemorial. Even today, we still gather plants, though much less so in our highly industrial urbanized life than was so a hundred years ago. However, the majority of wild plants gathered by mankind have remained firmly wild and have never been domesticated.

Yet some plants were domesticated, and in certain regions of the world only. There must have been, then, in the ancestors of these domesticated plants some special attribute which induced their cultivation. Alternatively, one might postulate that there was some attribute of the peoples of those regions which promoted the invention of agriculture there and nowhere else. Alternative "deterministic" hypotheses which seek to explain the origins of agriculture by postulating a certain stage of mental or sociological development in the peoples concerned or by progressive desiccation of the regions where they lived have not received much support latterly. They will be left to one side for the present though in the end we shall need to return to them, even if in a modified form.

Whilst much has been written on domestication, there are several areas where opinions differ, some of them drastically. For more than a hundred years researchers have wrestled with the questions of what domestication is, how it is detected, and when, where and why it happened. The past three decades in particular have witnessed a remarkable acceleration of interest in domestication, thanks to advances in our ability to detect the context, timing, and process of domestication in a wide array of different plant and animal species around the world (2). There is currently a raging debate on the progenitors of domesticated plants and animals and the phases of their domestication. Genetics is increasingly weighing in these discussions. This chapter focuses on overarching issues of defining, documenting, and tracing the path of plant and animal domestication, leaving the question of why to another occasion.

In terms of where the domestication of plants and animals occurred, there is general agreement that

the main centers of origin are South-West Asia, southeast Asia, Baluchistan, Mesoamerica, the tropical Andes, eastern North America and sub-Saharan Africa. The evidence for this derives from archaeological and palaeobotanical investigations, and new discoveries, especially in China, mean that this crucial development in the people–environment relationship requires constant reappraisal. Similarly, new developments in radiocarbon age determination, notably the advent of accelerator mass spectrometry (AMS), have begun to alter conventional wisdom about when the earliest domestications occurred. For example, new AMS age determinations from sites in Mesoamerica are beginning to change the chronology for agricultural development in the region. In addition, the ad



vent of techniques to ascertain the genetic characteristics of plants and animals is generating a new body of evidence to identify the wild ancestors of domesticated species and thus to identify centers of domestication. Similar techniques are also available to examine the genetic relationships between human groups, and data so generated are being used to identify the movement of people in relation to the spread of agriculture. While archaeological and palaeoenvironmental data provide information about the wild ancestors of domesticated species and the environmental context of early agriculture they do not and cannot reveal the motives for its inception. As is discussed in Chapter IV.3, most available evidence can be interpreted to support either a culturally based or an environmentally based rationale for such innovation, or indeed a combination of the two.

Understanding of the domestication of plants and animals and the early history of agricultural systems in Pakistan is handicapped by limited archaeological data. This is reflected in the controversy whether certain plants and animals were domesticated locally or ‘imported’ from the Near East in already ‘domesticated’ form. Controversy also surrounds the basic questions on the chronology of domestication for different crops in this region.

Defining Domestication: There are several definitions of domestication and many ways of

expressing them as they are of cultivation and agriculture (35). There may be little agreement as to precisely what these terms mean but they all refer to the same interaction between plants/animals and humans. In simple

terms, domestication refers to the process of reciprocation, by which animal and plant species come to depend on humans for survival, while providing humans with numerous benefits in return. Saying it in an other way, domestication is the process whereby a population of animals or plants, through a process of selection, becomes accustomed to human provision and control. The manipulation of plants has included activities as local clearance of vegetation and the planting, sowing, drainage and irrigation of mainly wild plants; and the manipulation of animals has included the keeping of pet mammals and birds and the "protective herding" and "free-range management" of wild ungulates.

A defining characteristic of domestication is artificial selection by humans. As a result, genetic changes occurred to distinguish domesticated species from their wild counterparts; such changes are unlikely to have occurred as a result of natural selection on wild populations. Since the domesticated plants and animals are genetically different from their counterparts in their reproductive patterns, domestication is essentially a biological phenomenon. Sometimes the changes in domesticated plants and animals are extreme, so extreme that the domesticated species cannot survive without the assistance of humans. This is an important characteristic that is uniquely human.

The question also arises: at what point along the process of domestication does the plant or animal becomes a domesticate? Is there a threshold that, once crossed, separates the “wild” from the “domestic”? If so, what does this threshold look like? To some extent, it remains a matter of personal preference to decide just when a domestic subsection of a plant or animal species has been created. Threshold criteria that require total genetic isolation and emergent speciation or complete dependence on humans for survival set a very high bar that many, if not most, widely accepted domesticates would fail to clear. Even somewhat looser standards that involve a lesser degree of genetic modification in the target plant or animal population, or a certain level of human investment in propagating, nurturing, or owning the resource, run the risk of constructing artificial boundaries along what was really a more seamless incremental process (7).

It appears that central questions about the definition, documentation, and explanation of domestication are not easily answered. Domestication cannot be simply defined as either a biological or a cultural phenomenon, but rather needs to be seen as a form of biological mutualism transformed by the highly developed human capacity to effect behavioral change through learning and cultural transmission. Definitional approaches to domestication are most effective, then, when they focus on the evolving relationship between humans and target plant or animal populations as a nexus between biology and culture, not on the manifestations or consequences of such relationships. Genetic and related morphological changes in domesticates are not defining features of domestication, but are instead artifacts of evolving relationships that vary in their intensity and pace of development. Notions of ownership and restructuring of social relations are similarly best viewed as possible results of domestication, not as central to its definition. Nor are the clear-cut thresholds that define when wild resources become domesticated ones. Rather than looking for definitive either-or boundary conditions in defining domesticates, it is much more profitable, if more challenging, to look at the whole span of evolving domestic relationships as they operate over various scales of investment on the part of both human and plant or animal partners.

Graeme Barker (7) advises that “it is best to step back and not focus too closely or obsessively on defining the exact demarcation between domestic and wild, and to turn, instead, to a consideration of the full span of the evolving nature of domestic relationships. Different stages in the evolution of this relationship might be characterized by the degree of investment by both partners - the human and the domesticate. For the plant or animal, this would involve the extent of genetic modification made in response to new selective pressures, the degree of its genetic isolation from populations not involved in the partnership, the nature of subsequent morphological or behavioral change, and its increasing co-dependency on humans. For humans, this might be the level of investment in the production of the resource; that is, in tilling, watering, burning, and land clearance, sowing, and transplanting plants, or in taming, protecting, herding, culling, and selectively breeding animals. It might also include the degree of incorporation of domesticates within the socio-economic organization of the human groups investing in its production”.

The Ancestors of Cultivated Plants: It is clear that the act of domestication necessarily assumes the existence of a corresponding wild form and that to arrive at some idea of the attributes of the ancestors of cultivated plants we must look at their closest wild relatives. However, we cannot study the direct ancestors of the present-day domesticates but only the so-called "ancestral species" which have continued to exist and develop in parallel with the cultivated plants, assuming that these ancestral species have retained many features from the period when domestication took place.

Braidwood is rightly credited for placing the wild progenitors of plants and animals at the center of their early domestication. Focusing the search on such habitats, whether it is his Middle East constellation, the millet areas of Africa, the corn/bean/ squash regions of the Americas, makes good sense but presents a problem that has not been addressed adequately.The modern distribution of these wild ancestors cannot necessarily reflect the distribution of the same species in the early Holocene. In large part, due to the density of research in the Middle East, archaeologists are beginning to come to grips with the problem there, but it has been a major research effort, involving a massive amount of work.

If then the growth and habitat requirements of the cultivated plants and their present-day closely related wild relatives are similar, we can safely assume that the original ancestor of the cultivated plant will have possessed similar ecological characteristics. Vavilov was convinced that "the wild species and varieties most akin to the cultivated plants, form one ecological group with the latter" and cites as examples barley, wheat, oats, lentils, melon, carrot and hemp, all of which possess wild relatives of similar ecological requirements.

Thecommonfactorincultivatedandin closely related wild species is their "weedy tendency", their ecological adaptation to "open", “disturbed”, or “unstable” habitats with bare soil and less competition from other plants. This makes use of an ecological, rather than a horticultural definition of weeds, as Bunting (149) and Harlan and de Wet (148) have pointed out, and defines a weed not in terms of whether it is an unwanted plant competing with those we are trying to cultivate but one which is adapted to disturbed or open habitats, often requiring high soil nitrogen and able to grow only in those areas where climax forest and grassland have been destroyed (36).

How then did the ancestors of our cultivated plants survive in pre-human or pre-agricultural times, given that they were unable to grow in dense plant communities of perennial trees, shrubs or herbs? Evidently they were restricted to disturbed soil along river banks, on gravel, rocks, screes, landslide

areas and places where the poor and intermittent rainfall was insufficient to support a vegetation of a perennial nature (scrub deserts, dry intermontane basins, for instance). Plants with weedy tendencies may well have evolved in or near the great glaciers which covered vast areas of the northern hemisphere after and during the great



The 'weedy' barley in a modern setting

Pleistocene glaciations. Other disturbed habitats are provided by the results of overgrazing of herbivores, traffic on game trails, animal trampling and bedding areas, the work of burrowing animals, etc. Clearly there were plenty of disturbed or open areas before the advent of man and he himself only enlarged and multiplied such areas, thus providing many more opportunities for plants with weedy tendencies to spread and increase in numbers. Even before the invention of agriculture, as Sauer (29) and others have suggested, man may have acted as an agent for ecological change by burning vegetation and clearing or trampling it near his camps and trails.

How environmental conditions affected the development of agriculture and domestication of animals in the Near East and elsewhere has been the topic of discussion for the past fifty years or more. The essential background for this discussion is the botanical and biogeographical evidence for the region of origin of particular crop species. Again, this is a story that mainly unfolds in the Near East. Unlike the Near East and Mediterranean, for which Zohary and Hopf (18) are an authoritative source, there is nothing equivalent for South Asia. Various botanical reference books contain information, but it is often of variable quality and reliability, and critical botanical reassessments are necessary for many species.

To go back to a point that was made earlier, man has always apparently been a food gatherer (apart from a hunter) and no doubt he gathered weed seeds along with the rest. Yet, curiously enough, some

groups of weeds have never become domesticated whilst other plants most obviously were domestiacted because of their ecological weediness. Thus, Englebrecht (150) put forward the view that certain primary crops offered themselves to the earliest collecting peoples by growing near their temporary settlements as "habitation weeds", favored by the high nutritive status of the soil. Such plants sought man out as much as he sought them out, because of their specific manurial requirements.

This has sometimes been called the "rubbish heap" hypothesis of the origin of agriculture - since it assumes that plants with weedy tendencies colonized kitchen middens and rubbish heaps and were thus gathered by primitive man and, imperceptibly perhaps, brought into cultivation. It does not, however, explain the exact processes of cultivation or throw light on the following points: (a) Why were plants domesticated only comparatively recently, some 9000 years ago, and thus for only 0.5% of the tota 2 million years of man's developmental history? (b) Why were only certain plants cultivated originally from the very wide range of gathered plants and the fairly wide range of plants with weedy tendencies? (c) Why were the origins of agriculture restricted to certain areas of the world, even though weeds seem to be fairly widespread and especially abundant in the northern temperate belts where agriculture did not, in fact, originate?' These questions are not easy to answer but we shall return to them in a separate Chapter that deals with some theoretical aspects of the subject.

Documenting Domestication - To Differentiate the Domesticate from the Wild : The process of domestication of plants and animals was once thought to be a ‘revolution’, an event that can be pinned down to a specific period of time at any specific location. This implies a clear-cut difference between a ‘domesticated’ plant or animal and its ‘wild‘ progenitor. But lately it is being realized that hunter-gatherers around the world have for many millennia routinely manipulated plant and animal populations in diverse ways to optimize their use of them before they were ‘domesticated’ (3). In this respect, domestication appears to be a process rather than an event and it must be viewed not as an event but a continuum. Archaeological evidence for such a view is coming from the research conducted in the Near East and it is already blurring the

(~10,500 cal BP), a proposed sign of domestication[3,5]. were the earliest ones (11,100–10,500 cal BP)[3].
A Prelude to Civilization
Box 2 | Phenotype of wild versus domesticated cereals and relevant terminology

The morphological differences that distinguish wild from domesticated cereals are crucial for understanding agricultural origins. A common complex of three basic characters emerged during the transition of all cereals from wild to domesticated forms (see figure). This is illustrated for einkorn wheat (*Triticum monococcum*), which was the first wheat to be domesticated. As for other cereals, domesticated einkorn wheat (b) differs from the wild form *T. boeoticum* (a) in three traits: first, the wild forms have small seeds, whereas those of domesticated forms are larger; second, the SPIKELETS **of wild ears fall apart at ripening through fragmentation of the rachis (by shattering or**

DISARTICULATION**), whereas the domesticated forms have a** TOUGH RACHIS **that**

holds the seeds together in a harvestable and threshable ear; third, the leaf-like structures that protect the seed (glumes) are attached

a **Wild *T. boeoticum*** Ear
Spikelet Seeds
Ripe spikelets disarticulating
Pointed
glume tips



Internode of
the brittle rachis
Shattering ear
b **Domesticated** Rachis ***T. monococcum***
Ear
Spikelet Smooth surface of the scar
Spikelet
Fully ripe ear
Rough surface of the scar
Seeds



Internode of
the tough rachis

tightly to the seed or are fused to it in wild forms, whereas they release the seed in the more advanced domesticated forms (which are therefore said to be free threshing or naked). Note that the ear of the species shown has two rows.

| GENETICS demarcation between wild.

Nevertheless, the effort for documenting the process of domestication or for differentiating the “domestic” from the “wild”, requires identifying some clearcut markers that can be explicitly linked to a specific aspect or stage of the unfolding domestication process. Some markers may be more effective in detecting different stages of this process than the others. Markers will also vary depending on the biology of the domesticate and its relationship with humans. There are, in particular, fundamental differences in the selective pressures on plants and animals undergoing domestication, and, as a result,

in the corresponding markers used to document plant and animal domestication. Selective pressures on plants, especially annuals, tend to operate directly on morphological traits that can, in turn, be used as unambiguous markers of domestication. Morphological impacts of the domestication of annuals may come about as largely automatic responses to human planting and harvesting that result in such changes as increased seed size, thinner seed coats, reconfiguration of seed head architecture, or the development of indehiscent seed pods. Intentional selection for specific morphological attributes in annual plants, such as larger fruit size, appear to happen later in the developing relationship of domestication (7).

It is difficult to distinguish between a wild and domesticated plant or animal during their early phase of domestication; the evidence is often indirect. The discovery of the remains (charred seeds, rind fragments, cobs) of a plant species known to be growing in an area beyond its natural range is one clue that people may have introduced it for cultivation. An over-abundance of seeds from a particular plant species may suggest that it is now being cultivated. More obvious, however, are actual morphological changes seen in a plant that suggest domestication has occurred.

Domestication implies that plants under cultivation have undergone actual genetic changes resulting from human selection or by adaptations by the plant to the human-manipulated environment. This is a form of genetic engineering, and at first, it probably resulted from people harvesting and ultimately selecting the seeds from particularly desirable wild plant specimens, such as those with larger seeds, bigger fruit, thinner seed coat, or more edible rind. Over time, this selection resulted in increasing the stands of plants with the desirable characteristics. For example, the difference between the wild and domesticated versions of plants may reflect an increase in seed size. When archaeologists see such changes in the seeds recovered from archaeological sites, they know that people are deliberately growing and harvesting these plants.

Recent years have seen an increase in the use of non-morphological markers of the intensification of human-plant interactions that may precede clear cut evidence of morphological change in plants. Evidence of land clearance, modification of natural drainage systems, intentional burning, and changes in the composition of weedy plants in archeological assemblages have all been effectively used to track human modification of landscapes and plant communities as part of the domestication process. The occurrence of plant macro- or micro fossils in areas thought to be far outside their natural range has also been interpreted as evidence of human transport and tending of plants.

There are special challenges to finding markers of animal domestication. This is because the leading-edge pressures on animals undergoing domestication are likely to focus on behavioral attributes rather than on morphological traits. There are a variety of behaviors that probably made certain animal species better candidates for domestication; among them tolerance of penning, a social structure based on dominance hierarchies, sexual precocity, weak alarm systems and, above all, reduced wariness and aggression. Behavioral responses to domestication in animals elaborated on these initial preselection qualifying attributes and include a general reduction in responsiveness to environmental stimuli, reduced activity levels, increased social compatibility, and intensified sexual behavior (7).

Many morphological traits commonly seen in domestic animals are thought to be linked to these behavioral changes. These attributes include piebald coats, lop ears and, of special importance here, reduced brain size and an overall juvenilization of cranial form. This latter feature may result in a shortened muzzle, tooth crowding, and reduction in tooth size, traits frequently seen as leading-edge markers of domestication in dogs and pigs. Selection for these behavioral traits and their associated morphological effects, however, may not be uniquely restricted to domestication. Similar behavioral traits, such as reduced wariness and timidity, are also selected for in animals such as rats and sparrows that develop commensal relationships with humans. These animals also show changes in pelage coloration and brain size. It is possible, then, that the initial modifications in tooth size and cranial form in pigs and dogs, widely seen as markers of domestication, may in fact be attributable to an early commensal relationship between humans and such omnivore species that began their association with humans as camp-follower scavengers (8).

Other genetically driven morphological changes in animals undergoing domestication come about when humans begin deliberately selecting breeding partners. Changes in the size and shape of horns in animals like goats and sheep, for example, are directly tied to the relaxation of selective pressures for and, quite likely, active selection against large horns once humans assume control over breeding. Other morphological changes may ensue when animals are moved into new territories, either through founder effects, random genetic drift, or directed adaptation to new environmental conditions. Later still, and probably much later in animals than in plants, deliberate human selection for attributes that enhance meat, fiber, milk yields, or labor potential may result in still other morphological markers that might be used to detect intensification in the human-animal relationship.

Domestication has also been suggested to have resulted in a marked and rapid reduction in body size, which, until recently, has been widely held to be a definitive marker of initial domestication. This proposed morphological response has been variously attributed to a plastic response to nutritional deficiencies, an adaptive advantage of smaller bodies for animals subjected to impoverished conditions, or deliberate human selection for more tractable individuals. But body size in animals is also known to be affected by well-documented factors such as sex, environment, climate, and age, which may be entirely unrelated to domestication and may mask or be mistaken for changes in body size induced by domestication (7).

Morphological changes of the sort listed above appear only when domestication has been underway for a long time and will not be apparent in the early stages. For example, it has been estimated that it took thousands of years of domestication for such changes to become apparent in the case of the horse, while they were faster in the case of cattle, goats, and sheep. Nevertheless, once such changes manifest themselves, it is usually possible for scientists to study the animal bones and teeth found at an archaeological site and to identify not only the animal they represent, but also whether this animal was wild or domesticated. The task of identifying the bones of a domesticated variety of an animal is made easier if bones of wild or transitional forms are also present at the site.

The requirement that domesticates show evidence of morphological or even genetic change, however, is not universally accepted. Nor is the basic premise underlying this requirement that the process of domestication is contingent on reproductive isolation and resultant genetically driven morphological change. This is particularly true for animals, where morphological change, when it occurs at all, is often both delayed and difficult to tie directly to domestication. As a result, many researchers define animal domestication not in terms of ob- served genetic or morphological change,

but in terms of causal human behavior. According to this view, domestication falls along a continuum of increasing human intervention ranging from predation to genetic engineering in which there are varying degrees of investment in altering an animal's natural behavior to suit human needs.

A similar view is becoming increasingly common in considerations of plant domestication especially perennial plants such as root crops propagated through vegetative cloning or very longlived tree crops in which genetic and morphological change may be less automatic and more subtle than in annual seed crops. This emphasis on the evolving relationship between humans and plant or animal populations turns attention away from a range of secondary consequences of domestication, such as genetic and morphological change or social notions of property, and properly returns it to a consideration of the new partnership that humans create with target populations.

Given the looser connection between domestication and morphological change in animals, it is not surprising that considerable attention has been devoted to identifying markers of domestication that do not rely on genetically driven morphological change, but that, instead, reflect human actions directed at managing animals. Demographic markers aimed at detecting the different harvest strate gies of hunters and herders were among the first non-morphological markers used to detect animal domestication. Largely abandoned in the 1980s and 1990s, when most archeozoologists embraced size reduction as a leading-edge marker of animal domestication, demographic markers are seeing a resurgence, thanks in part to the development of methods for constructing high-resolution sexspecific harvest profiles. Applying these methods to archeological assemblages has shown that what was once interpreted as evidence of domestication - induced body size reduction in goats (and likely other livestock species) is, instead, a reflection of a change in the demographics of the adult portion of managed herds dominated by females. Unambiguous changes in morphological traits such as body size or horn form seem to postdate human management of herd animals by hundreds of years and represent later phases in the domestication process (7).

Apart from the direct scientific analysis of animal bones, there are other ways of inferring animal domestication. Animals found outside their natural habitat - for instance, mountain goats found in the plains - suggest domestication. Age and sex ratios reflected in the faunal assemblage can also provide important clues. In the wild, the malefemale proportion among animals is 1: 1. However, when they are bred, males and castrates are killed quite young and females are killed in old age. These patterns can be identified in the faunal record. A sudden dramatic increase in a previously little-exploited animal have also been used as markers of animal domestication. But the use of these markers (in both animals and plants) needs to be tempered by acknowledgment of our generally poor understanding of the geographic range of biotic communities in the past and of the paleoenvironmental conditions that shaped these ranges. A rapid increase in the abundance of a plant or animal resource in an archeological assemblage might simply signal the intensification of hunting and gathering strategies, not the beginning of food production.

Markers of animal domestication may also be found in plastic, non-genetically driven responses such as bone and tooth pathologies, evidence of pandemic disease, or chemical changes in the composition of bone and tooth enamel used to track changes in nutrition and the seasonal movement of managed animals. The presence of corrals, pens, or other traces of animals, such as manure or hoof prints, in human settlements, changes in human settlement patterns, artifacts related to the exploitation of domestic animals (bits or milk churns and storage vessels), and even changes in food distribution patterns have been used with varying effect to build cases for animal domestication. The application

of these later plastic responses and cultural markers needs to be tempered by the realization that they may not be manifested in all instances of animal domestication or may result from other pressures unrelated to domestication. Application of such markers is most effective when many of them are brought together to build strong circumstantial cases for domestication (7).

Just as in the case of animals, wild and domesticated plant grains and seeds can also be differentiated under conditions of domestication. Over a long period of time, plants undergo certain morphological changes. For example, the grains of wild wheat and barley are larger than those of domesticated varieties. Wild varieties of wheat and barley have brittle ears and fragile spikes and their ears break apart immediately on reaching maturity. This is the natural way in which plants maximize their seed dispersal. In the case of domesticated wheat and barley, on the other hand, the ears break up only at the stage of threshing.

Advances in methods for extracting and amplifying both modern and ancient DNA is recent years have provided an exciting new window on the genetic changes associated with the domestication of plants and animals. Some of this work has focused on identifying the genes or gene complexes that are specifically selected for or against in the process of domestication, especially of crop plants. However, most genetic studies of domestication look to largely neutral noncoding loci and organellar genomes. These procedures have proven useful in tracing the divergence of domesticates from their wild progenitors; identifying the number and geographic location of domestication events, which now appear to have been multiple for most animal domesticates and many plant crops; and in tracking the dispersal of domesticates and their human partners out of centers of origin (7).

There are critical differences in the relative rates of evolution in the different genomes of plants and animals that play a major role in the genetic markers used. The relatively rapid rate of evolution in mitochondrial DNA (mtDNA) in animals makes mtDNA particularly well suited to tracking the relatively shallow time depth of divergence between domesticates and their wild progenitors (10,000 years). This is why most studies of animal domesticates focus on this genome. While it is less variable than mtDNA and evolves much more slowly, Ychromosome nuclear DNA provides a window into patrilineal inheritance, which in many animal domesticates is quite different from matrilineal history. Variation in noncoding nuclear microsatellite DNA, contributed by both parents, has also proven useful in tracking the divergence of different breeds of animals.

While not approaching the rate of evolution of animal mtDNA, loci in the nuclear genome of plants evolve at about the same rate as nDNA loci in mammals. They also evolve about four times faster than loci in the choloroplast genome and twelve times faster than plant mtDNA. Consequently, genetic studies of plant domestication tend to focus on nDNA, especially on highly polymorphic microsatellites that provide sufficient intraspecific variation to document the domestication process. The nuclear genome in plants has proven especially useful in tracking down the various ancestral genomes contributing to the complicated genetic heritage of hybrids and polyploid crop plants. These common conditions in plant crops generally are not found among animal domesticates (7).

Most genetic approaches to documenting are based on modern domesticates and likely wild progenitor species. But the window they provide on the origin and early dispersal of domesticates is unavoidably clouded by thousands of years of selective breeding, hybridization, and introgression between wild and domestic populations. Ancient DNA (aDNA), on the other hand, has the potential to shed more direct light on the process of genetic divergence of domesticates. Due to the greater

preservation of DNA encased in animal bone and the suitability of mtDNA in animals for tracking shallow time depth divergences, aDNA studies of animal domesticates have been particularly successful, especially those tracing the more recent dispersal of domestic animals through temperate environments. Although it is more difficult to extract enough nDNA from un-charred archeological plant remains to provide meaningful results, some stunning results have recently been obtained in the use of aDNA to track the origin and dispersal of domestic plants (7).

Graeme Barker (7) warns us that in the excitement over the possible contributions of genetic analysis to the documentation of plant and animal domestication, it is important not to lose sight of the fact that there is more to domestication than genetic change. The real power of these new tools for tracking the trajectory of domestication can be realized only when genetic analyses are more fully integrated into broader archeological analyses. Genetic studies represent one, albeit very powerful, line among many parallel and mutually illuminating lines of evidence, which, when considered together, provide a fine-grained view of unfolding domestic partnerships.

Problems of identification of domesticated animals from the wild, or the cattle from the water buffalo, for instance, are acute in South Asian archaeology because of the presence in archaeological sites of skeletal parts that are morphologically quite similar between taxa. The most common difficulties of identification relate to distinguishing the bones of different forms of bovids, for example, differentiating *Ovis* (sheep) from *Capra* (goat) from *Gazella* (chinkara) from *Anti/ope* (black-buck) as well as *Bos* (cattle) from *Bubalus* (water buffalo) from *Boselaphus* (nilgai). There also can be problems distinguishing the bones of bovids from those of cervids (deer) and the remains of the various cervids from each other. Only comprehensive modem collections and detailed comparative osteologies based on those collections can begin to overcome these difficulties. An especially problematic analytic practice can be to use bones identified from one archaeological site to help identify those from another. While this approach is acceptable if the material has been identified correctly in the first instance, incorrect identifications will perpetuate gross error into subsequent analyses.

To differentiate the domesticated plants and their seeds from the wild species, the archaeobotanist looks for larger seeds, and, with the cereals, a change in the rachis, the tiny joining piece that connects the grain to the ear. With the cereals, the size differences in the grains are often not statistically distinct enough to distinguish domesticated from wild, and so carbonized rachis fragments can be the clinching evidence. In wild cereals the rachis is brittle, and the grains are easily dropped as they ripen. But there is in nature a small minority of plants with a tough rachis, so that grains are retained on the plant. Complete rachises in a sample, with neat scars where they separated from the ear and the grain, are evidence of a species. Broken rachis fragments indicate that grains tough rachises have been harvested, suggesting the domesticated form.

It may appear from the above discussion that there are no easy, universally applicable ways to document domestication. Instead, documenting domestication requires a clear understanding of the species-specific linkage between a proposed marker of domestication and the stage of the unfolding domestication process it is held to mark. It also requires recognizing that markers vary depending on the biology of the species involved and the cultural context of human populations engaged in the domestication process. Above all, effective documentation means not letting the availability of new scientific techniques lead the search for new markers without first thinking about how the process of domestication might manifest itself in whatever these techniques are designed to measure.

Archaeological Evidence for Domestication: It is not easy to preserve seeds, tubers, leaves, and other delicate organic materials for thousands of years. Most scientific understanding of ancient human plant use has therefore come from the archaeo-botanical study of macrofossils of seeds, fruits, and nutshell fragments. Archaeologists recover some macrofossils from depositional environments that are always dry, wet, or frozen, because all of these conditions slow down or halt the process of decomposition. Most, however, are preserved because the way they were harvested, threshed, processed for consumption, or discarded, brought them into contact with enough fire to char them, but not enough heat to reduce them to ash. Once charred, macrofossils preserve well in many kinds of archaeological sites and can often be classified to genus, if not to species. Macrofossils offer direct evidence for important archaeological research such as reconstructing hunter-gatherer plant use patterns, identifying farming locations, and determining the precise nature of harvested crops. They also provide insights of other kinds.

The major shortcomings of macrofossilbased interpretations of past human plant use are due to potential preservation biases. Plant macrofossils tend to be preserved because they were charred before entering the archaeological record. But not all plant parts char easily, and many don't char at all. For example, it's pretty easy to char a bean, but you'll be disappointed if you try the same thing with a leaf of lettuce. Because the necessary conditions could only be met sometimes in prehistory and by some plants and plant parts, archaeologists are understandably concerned about the validity and reliability of many reconstructions of human plant use that are based only on macrofossils.

Right now, the best archaeological data on the shift toward food production come from sites located in arid regions of both hemispheres, where ancient organic remains are best preserved. Were the first steps toward farming really taken in such seemingly marginal agricultural situations, or are dry areas just better environments for preservation? Many researchers are still convinced that most of our significant food plants originated in the dry temperate environments and that they were probably domesticated there, too. But not all archaeobotanists agree; some argue instead that early domesticated forms may have been introduced from other, more humid environments, where preservation is poor and research has been limited.

Fortunately, modern archaeologists can turn to several other important sources in their research on prehistoric human plant use. Plant microfossils, such as pollen, phytoliths, and starch grains, often survive even where macrofossils can't - for example, as residues on the cutting edges of ancient stone tools, inside pottery containers, and embedded in the pores of grinding stones. Unlike many macrofossils, these remains preserve readily in a wide range of archaeological contexts; they can be classified as to the kind of plant they represent, if not also to the plant part they represent; and they can be archaeologically present even in sites where macrofossils were destroyed or never deposited.

Pollen grains have been a valuable source of environmental and subsistence data for decades. Their strengths are that they're abundant; the grains are taxonomically distinctive and often can be classified to genus, if not to species; the outer shell of each grain is tough; and the wind-borne dispersal of pollen from seed-producing plants continues before, during, and after humans occupy a particular archaeological site. The main shortcoming of pollen grains is that they tend to preserve poorly in many kinds of open sites, depending on soil acidity, moisture, drainage, and weathering.

Phytoliths are less familiar, but potentially even more valuable than many macrofossils. They're microscopic, inorganic structures that form in many seed-producing plants as well as other plants.

Like pollen, phytoliths are taxonomically distinctive. They even vary according to where they form in the plant, so phytoliths from leaves can be distinguished from those that formed in the stems and seeds of the same plant. Importantly, they don't suffer from the same preservation biases that macrofossils do.

Starch grains are subcellular particles that form in all plant parts. They are particularly abundant in such economically important portions as seeds and tubers. They are a useful complement to phytoliths as a data source and are a major tool in archaeological investigations of root crops. Like pollen and phytoliths, starch grains can be taxonomically classified, currently mostly to family or genus. A good example of the archaeological application of starch grain analysis is the recent examination of the surface of a grinding stone found on the floor of one of the 23,000-year-old huts at Ohalo II in Israel. This study, which was based on carefully sampled residues from cracks and pits in the working surface of the grinding stone, enabled archaeobotanists to identify that it was a specialized implement used to grind wild cereal grasses, including barley.

Some plant species also leave biochemical traces in those who consume them. Because temperate and tropical region plants evolved with slightly different processes for photosynthesis, their chemical compositions vary in the ratio of carbon-13 to C^{12}. This distinctive chemical profile gets passed along the food chain, and the bones of the human skeleton may provide evidence of dietary change. For example, their lower C^{13} levels reveal that females at Grasshopper Pueblo, in east-central Arizona, consumed mostly the local plants they gathered, while their male relatives at first enjoyed more maize, a plant higher in C^{13}. Later, maize became a staple in everyone's diet at Grasshopper, resulting in equivalent carbon isotopes in males and females.

Other biochemical analyses, using different isotopes, have been devised to assess overall dietnot necessarily just the domesticated portions-from individual skele- tons. A higher ratio of nitrogen-I5 to nitrogen-14 (N^{15}/N^{14}), for instance, corresponds to a greater seafood component to the diet, while a higher strontium-to-calcium (Sr/Ca) ratio indicates that plant foods were of greater dietary importance than meat. Other chemicals taken up by bones may inform us about ancient lifeways. For example, lead (Pb) is a trace element found in unusually high concentration in the bones of Romans who drank wine stored in the lead containers typical of that period. The interplay among culture, diet, and biology is, of course, a prime example of biocultural evolution.

Microfossil analyses complement and greatly extend the valuable insights that archaeobotanists have achieved through the study of macrofossils. Recent key advances include the growing field of *archaeogenetics*, which applies the methods of molecular genetics to archaeological problems, as well as improvements in radiocarbon dating, which can yield accurate age estimates from samples as small as 100 micrograms (µg) - that's one ten-thousandth of a gram, or roughly one-fifth the weight of a grain of rice. As a result, researchers are now able to more completely understand the prehistory of the human use of plants and the beginnings of agriculture.

To some extent, the process of animal domestication differed from plant domestication, and it probably varied even from one animal species to another. For example, the dog was one of the first domesticated animals; mtDNA evidence suggests an origin between 40,000 and 15,000 years ago, and dogs may even have accompanied late Ice Age hunter-gatherers. The dog's relationship with humans was different (and it still is) from that of most subsequently domesticated animals. Often valued less for its meat or hide, a dog's primary role was most likely as a ferocious hunting weapon under at

least a bit of human control and direction. As people domesticated other animals, they changed the dog's behavior even more for service as a herder and later, in the Arctic and among the Native Americans of the Great Plains, as an occasional transporter of possessions. But the burial of a puppy with a Natufian person who died some 12,000 years ago in the Near East suggests that dogs may have earned a role as pets very early.

Most other domesticated animals were maintained solely for their meat at first. Research in Spain and Portugal has shown that that meat remained the primary product up until about 4,000 years ago, when subsequent changes in herd composition (age and sex ratios), slaughter patterns, and popularity of certain breeds all point to new uses for some livestock. Oxen pulled plows, horses carried people and things, cattle and goats contributed milk products, and sheep were raised for wool. Animal waste became fertilizer in agricultural areas. Leather, horn, and bone-and even social status for the animals' owners were other valued by-products.

Of course, animals are more mobile than plants, and most of them are no less mobile than the early people pursuing them. So it's unlikely that hunters could have promoted useful genetic changes in wild animals just by trying to restrict their movements or by selective hunting alone. Possibly, by simultaneously destroying wild predators and reducing the number of competing herbivores, humans became surrogate protectors of the herds, though this arrangement would not have had the genetic impact of actual domestication.

Animals such as gazelle or reindeer might be managed to a degree in the wild state, possibly by establishing a "rapport" with the herds and encouraging them to graze in cleared areas in the winter or by restricting hunting activities to a few quick raids, during which the herd might be selectively harvested or thinned. Culling out all nonbreeding males, for example, wouldn't limit the potential for herd expansion, and it wouldn't have much effect on the population genetics. Epi-paleolithic Natufians in the Near East were once thought to have managed wild gazelle in this way; but reexamination of the faunal remains casts these peoples' gazelle hunting in a very different light, implying the use of largescale surrounds or ambush techniques to nonselectively kill entire herds at once. This drastic approach would suppress the animal population for years. Obviously, true domestication, involving further genetic changes, must have been reached by other steps. '

Since domestication is a process, not an event, it's nearly impossible to say precisely when a plant or animal species has been domesticated. The process involves much more than an indication of "tameness" in the presence of humans. More significant are the changes in allele frequencies that result from selective breeding and isolation from wild relatives. People may have started with young animals spared by hunters for that purpose or, in the case of large and dangerous species such as the auroch (the wild ancestor of domesticated cattle), with individuals that were exceptionally docile or small. Maintained in captivity, these animals could be selectively bred for desirable traits, such as more meat, fat, wool, or strength. Once early farmers were consistently selecting breeding stock according to some criteria and succeeding in perpetuating those characteristics through subsequent generations, then domestication-that is, evolution-clearly had occurred.

Archaeological evidence of animal domestication is subtle and difficult to assess from the bones themselves. For most species, no significant increase in body size occurred, and early domesticated cattle, sheep, and goats are actually smaller than their wild relatives. Comparisons of the bones of wild and domestic members of the same species disclose only relatively minor differences in skeletal

form. For example, the bony horn cores of domestic goats display a somewhat flattened cross section when compared with their wild antecedents, and domesticated pigs exhibit a shortening of the upper jaw (maxilla) in relation to the lower jaw (mandible).

The Mechanism of Domestication: There is debate within the scientific community over how the process of domestication works. Some researchers give credit to natural selection, where mutations outside of human control make some members of a species more compatible to human cultivation or companionship. Others have shown that carefully controlled selective breeding is responsible for many of the collective changes associated with domestication. These categories are not mutually exclusive and it is likely that natural selection and selective breeding have both played an equal role in the processes of domestication throughout history. Either way, a process of selection is involved. The domestication of wheat is an example of this.

Wild wheat falls to the ground to reseed itself when it is ripe, but domesticated wheat stays on the stem when it is ripe. There is evidence that this critical change came about as a result of a random mutation near the beginning of wheat's cultivation. Wheat with this mutation was the only wheat harvested and became the seed for the next crop. This wheat was much more useful to farmers and became the basis for the various strains of domesticated wheat that have since been developed.

The example of wheat has led some to speculate that mutations may have been the basis for other early instances of domestication. For example, it is speculated that a mutation made some wolves less wary of humans. This allowed these wolves to start following humans to scavenge for food in their garbage dumps. Presumably a symbiotic relationship developed between humans and this population of wolves. The wolves benefited from human food scraps, and humans may have found that the wolves could warn them of approaching enemies, help with hunting, carry loads, provide warmth, or supplement their food supply. As this relationship evolved, humans eventually began to raise the wolves and breed the types of dogs that we have today.

With rapid and ingenious technological advancements in biology and sciences related to agriculture, scientists have devised methods to experimentally induce genetic variation to create new varieties of plants and animals choosing useful traits. Induction of gene mutation, altering chromosome number and structure, hybridization and exploitation have all played a crucial role in the efforts at genetic modification in classical agriculture and animal husbandry. Nevertheless, natural genetic variation continued to be an important component of their options.



Rock painting at Chauvet Cave, France, ca. 32,000 BC.

Lascaux paintings in the Dordogne, France, dated to *ca.*

17,000 years ago. These depiction of cattle, however, does not mean that this species was domesticated.

Genetically, there are now over 100,000 varieties of rice, 70,000 varieties of wheat, 15,000 varieties of beans and 12,000 varieties of potato, besides several thousand varieties of other crops. The high yielding IR 64, one of the very popular varieties of rice, is the result of extensive hybridization involving over 160 parents in its lineage. Repeated hybridization with wild relatives of wheat that are resistant to the devastating wheat rust disease, produced cultivated wheat varieties resistant to the disease. Durum wheat, used to make pasta, is man made. Triticale, a hybrid between wheat and rye (belonging to two different genera, *Triticum*and *Secale)*) that took 100 years to succeed, can withstand the severe winter temperatures.

Some researchers maintain that selective breeding rather than mutation or natural selection best explains how the process of domestication typically worked. They point out that domestication involves the removal of species from the wild, and their propagation by humans within a sheltered or manipulated setting. As a result, domesticates are subjected to different selective pressures from their wild relatives, and so undergo morphological and genetic changes, differentiating them from their wild ancestors which were evolving primarily through processes of natural selection. For instance, humans, may have prefer smaller and more docile individuals in a herd or may have wanted to breed new forms that have specially valued characteristics, such as woolly sheep. These imposed conditions on the normal course of evolution had the effect of creating the domesticated species of plants and animals which are familiar to us in the present time.

The arguments for selective breeding or “forced and directional” evolution are attractive and commonsensical for explaining the process of domestication. However, this paradigm does not account for all rationalizations and there are other scientists who believe that selective breeding cannot always achieve domestication. They point out that known attempts to domesticate several kinds of wild animals in this way have failed repeatedly. The zebra is one example. Surprisingly only 14 species of large animal seem to be capable of domestication. In approximate order of their earliest domestication these are: dog, sheep, goat, pig, cow, horse, donkey, water buffalo, llama/alpaca, bactrian camel, and Arabian camel.

Howsoever the processes of domestication occurred, their general direction was the same, that is, the eventual result of these changes was the emergence of distinct domesticated species, many (though not all) of which could no longer survive in the wild without human intervention. Furthermore, the success of the new food production economy, based on effective combinations, or "packages’ of domestic plants and animals led to relatively rapid expansion at the expense of hunting and gathering. As a result, species were carried by human action to far beyond the geographical range of their wild ancestors. Cereals of Southwest Asian origin came to be cultivated in northern Europe, where there were no indigenous wild relatives.

Foragers’ Connection to Domestication: The subject has already been discussed in Section II. The following remarks should be considered as supplementary.

Although plant foods must have continued to play a major role in hominin diet, just as they do today for modern humans, the evidence for this is scanty. Where it does exist, it comprises carbonized seeds, husks, etc., or occasionally macroscopic plant remains which have become sealed in anaerobic sediments. Evidence for plant use prior to 12,000 years ago, i.e., prior to the end of the last glaciation,

is particularly scarce. A rare example of plant-food remains is that of Zhoukoudian, near Beijing, China, where hominin fossils of *Homo erectus* have been discovered. The cave deposits also contain the remains of Chinese hackberry, walnut and hazelnut and are dated to between 460,000 years ago and 230 years ago (85). Another example is the upper Paleolithic site of Dolni Vestonice II in the Czech Republic which has been investigated by Mason *et al*. (86). This site is dated to *ca*. 25,000 years ago; pollen and plant macrofossils indicate the presence of a wide range of plant species and the likely consumption of roots of species of *Asteraceae/Compositae*. Moreover, Loy *et al*. (87,88) have applied biochemical techniques to the detection of plant foods on stone artifacts, from the Solomon Islands, which are dated to 28,000 years ago. The starch residues discovered are those of taros which were being exploited as a food source. Plant remains from Wadi Kubbaniya in Egypt also attest to the exploitation of a range of plant species in preagricultural times. These remains are dated to between 18,000 and 17,000 years ago; some 25 different types of seeds, fruits and vegetable tissue have been identified, the modern species of which are used by present-day hunter-gatherers. A later survey of plant use and the remains of foodprocessing apparatus in Europe by Zvelebil (89) also highlights evidence for the consumption of hazelnuts and acorns.

In contrast, there is abundant evidence for hunting, a food-procurement strategy that characterized communities of *Homo erectus*, an early hominin ancestor of *Homo sapiens sapiens*. This species is considered to have evolved *ca*. 2,000,000 years ago in Africa from whence it migrated into Europe and Asia. Although there is little direct evidence for hunting until after *ca*. 500,000 years ago, the anatomy of skeletons of Homo *erectus* indicates small gastrointestinal tracts, as they are in predators generally in contrast to herbivores. This decrease in gut size has been interpreted as a means of compensating for the increased metabolic rate associated with the relatively large brain size of Homo *erectus*. It is likely that decreasing gut size occurred as larger brains evolved and that both were associated with the acquisition of hunting skills. Indeed, the cave sediments of Zhoukoudian, referred to above, contain tools and bone remains of the thick jaw-bone deer and sika deer which were hunted.

For the period 40,000 years ago to *ca*. 10,000 years ago, evidence for hunting derives from a variety of sources. For example, there are several cave sites in Europe wherein hunters depicted their prey in paintings. The oldest of these, Chauvet in France, is dated at 32,000 years ago. Another example is the famous Lascaux paintings in the Dordogne, France, which are dated to *ca*. 17,000 years ago. This art is the work of archaic Homo *sapiens* or modern Homo *sapiens sapiens* and reflects the sophistication of hunting strategies. The Neanderthals were also active hunters and according to Hublin *et al*. (90) they coexisted with modern humans until *ca*. 34,000 years ago when they became extinct. Another example of an archaeological site with evidence of hunting is at Mezmaiska Cave, northwestern Caucasus, Russia. The remains of ungulate species include steppe bison, Caucasian goat, Asiatic mouflon and reindeer and the site is dated *ca*. 35,000 years ago. Similarly, at Makarovo and Varvarina Gora, archaeological sites near Lake Baikal, Russia, there are tool assemblages and bone assemblages which reflect hunting activities *ca*. 38,000 or 39,000 years ago.



In prehistoric times, the wild barley grew as a grass over a large area in the Near East, Central Asia, Afghanistan, Baluchistan, and the foothills of the Himalayas. Thus, it could have been domesticated anywhere in Eurasia

The first region in world prehistory for which we have extensive evidence for a shift from a hunting and gathering way of life to farming and animal keeping is from the Near East between 8,000 and 10,000 years ago. The main domesticated plants were cereal grasses (rye, wheat, barley, and pulses) documented over an area that extends from the eastern Mediterranean to southern Turkey, Syria, Iraq, and western Iran. Domestication of sheep, goats, and cattle followed closely on the heels of the adoption of domesticated plants in the same region. Since agriculture and animal keeping in South Asia began slightly later and since they included some of the same cereals, pulses, and domesticated animals as those identified in the Near East, it has been assumed that agriculture originated in the Near East from where it spread to other areas in the West as well as in the East. This orthodoxy is, however, being increasingly questioned in recent years and the ‘cradle of agriculture’ is being set free from its anchor in the Near East.

In Southwest Asia, archaeological sites that immediately predate domestication attest to the hunting of bezoar goat, aurochs, wild boar and mouflon. All these species were subsequently domesticated, as discussed below. However, there are some other species which are well represented in the bone assemblages of preagricultural sites but which did not subsequently become domesticated. One of the most significant of these was the mountain gazelle. This begs the question as to why certain species were domesticated whilst others were not, as discussed by Clutton-Brock (91).

The greater labor involved in cultivation and the fact that it did not at first greatly enhance the peoples' security or living standards caused many bands to stay with long-tested subsistence strategies. Through most of the Neolithic period, sedentary agricultural communities coexisted with more numerous bands of hunters and gatherers, migratory cultivators, and hunters and fishers. Even after sedentary agriculture became the basis for the livelihood of the majority of humans, hunters and gatherers and shifting cultivators held out in many areas of the globe. For example, due to the absence of the horse and most herd animals in the Americas, nomadic hunting cultures became the main alternatives there.

A gradation in living style and subsistence regime necessitate the existence of the Neolithic farmers side by side with hunter-gatherers. This applied to the Greater Indus Valley as it did to other parts of the world. What we find in the archaeological and ethnohistorical record is that huntergatherers quickly adapted to the use of domesticated animals, especially cattle and goats. Thus, determining just who is a hunter-gatherer and who is not can be difficult, and illustrates the limited use of this kind of typological approach to anthropological data. There is also evidence that prehistoric hunters-gathers obtained food grains, either by trade or cultivation, or both. While they continued to hunt and gather for much of their livelihood they were also herders, and formed important relationships with settled farmers, pastoral nomads and the others in the region. The key to hunter-gather survival lied not in isolated self-reliance, but on the establishment of a symbiotic relationship with the peoples around them. They hunted wild animals and gathered forest products that were traded to their neighbors for agricultural, animal and craft products, like grain, milk, metal implements and cloth.

Where and When? There is a considerable body of archaeological and palaeobotanical evidence which indicates where plant domestication occurred. Moreover, the application of radiocarbon age determination has allowed a chronological sequence of events to be constructed, though revisions are now necessary because of anomalies produced by improvements in the radiocarbon technique. The identification of so-called centers of plant domestication was initially undertaken by the Russian botanist Nikolai Vavilov in the 1930s. He suggested that centers were likely to coincide with those areas characterized by high diversity of crops, i.e. regions in which many potential sources of plant foods are present and where the wild relatives of domesticated species are abundant. This assumption is rather simplistic and flawed, as Harris (35) has discussed. Nevertheless, a plentiful supply of wild foods may have encouraged the adoption of sedentary lifestyles by hunter-gatherers and then, when conditions changed for whatever reason (see below), domestication of plants and agriculture may have ensued.

There is general agreement that the main centers of origin are southwest Asia, southeast Asia, Baluchistan, Mesoamerica, the tropical Andes, eastern North America and sub-Saharan Africa. The evidence for this derives from archaeological and paleobotanical investigations, and new discoveries, especially in China, mean that this crucial development in the people–environment relationship requires constant reappraisal. Until recently, the earliest dates were from sites in southwest Asia, notably for the domestication of wheat and barley *ca*. 10,000 years ago but new evidence from China may push back the initial domestication (of rice) to *ca*. 11,000 years ago (93).

According to Zohary and Hopf (18), wheat was domesticated, along with barley, *ca*. 10,000 years ago in southwest Asia. It is thought that modern bread wheat originated as a hybrid between emmer wheat and another *Triticum* species (*T. tauschii*). From its area of emergence in the region south east of the Caspian Sea, bread wheat along with emmer wheat were introduced into Europe and Asia. Recent

work on the genetic constitution of numerous wild einkorn lines in the region between southeast Turkey and western Iran has also helped to establish where domestication of this species occurred. Heun *et al*. (97) examined DNA from 68 lines of cultivated einkorn and 261 wild einkorn lines from this region and nearby. Their results show that the most distinct lines genetically come from the Karacadag Mountains, southeast Turkey. Moreover, these lines were also the closest genetically to the cultivated lines, implying that the wild lines comprised the ancestors of cultivated einkorn. This possibility is also supported by the fact that archaeological sites in the region contain remains of both wild and cultivated einkorn. These sites include Cafer Höyük, Cayönü and Nevali Cori which are some of the earliest agricultural settlements in southwest Asia.

Barley, lentil and olive were other early domesticates in this centre from whence they influenced the development of agriculture in Europe and Asia as did flax which was selected for its fibre. The adoption of domesticated species, along with the continued use of wild cereals and pulses, was widespread by *ca*. 9,000 years ago as is evidenced by remains of wild and domesticated plants at several archaeological sites in the valley of the middle Euphrates. As with rice and other crops, there is considerable debate about the possibility of multiple domestications of individual crops as compared with single domestications, i.e., polyphyletic evolution and monophyletic evolution. In relation to the crop assemblages that originated in southwest Asia, genetic data indicate that monophyletic evolution is most likely.

The most important crop in terms of modern world agriculture to emanate from the sub-Saharan center is sorghum. According to Harlan (98,99), the earliest evidence for this is a grain impression on pottery approximately four thousand years old. Many other crops were domesticated in this center, including African rice, various millets, various oil crops, yam, coffee and old-world cotton. Although this center produced a wide range of crops, little is known about the spatial and temporal patterns of plant domestication. Harlan has suggested that agricultural systems were emerging by *ca*. 7,000 years ago and that by 5,000 years ago pastoralism based on cattle was widespread, with sorghum cultivation beginning *ca*. 4,000 years ago and pearl millet later at *ca*. 3,000 years ago.

The case of domestication of animals is just as murky. One question, which has been debated endlessly in recent years is whether pastoral societies, the human groups who are engaged in animal husbandry but otherwise are foragers, can exist without the benefits of agriculture. A large number of scholars subscribe to a necessary linkage between pastoralism and agriculture. This insistence on the existing of agriculture for the emergence and sustenance of pastoralism draws heavily on the model of Australian or Kalahari Desert groups, or Arctic hunters, living in environments too hostile for agriculture but on the fringes of the areas where agriculture does exist. Recent research, however, indicates that pastoralism could have existed, and did exist, in the absence of agriculture. This is evident in the case of parts of Africa where in the early to midHolocene Sahara cattle herding may have begun before 7000 BC, at a time when no domesticated plants are known from the region (9). Most of the sites across the Sahara with archaeobotanical evidence indicate grass-seed foraging and limited herding of cattle together with hunting, with evidence of plant domesticates and more sedentary sites only from the third or early second millennium BC. In the high Andes of Peru, available evidence suggest that hunter-gatherers gradually brought camelids (llama/alpaca) under control through an *in situ* domestication process in the mid Holocene, but they utilized entirely wild plants. Subsequently sedentism emerged and camelid herds were integrated into economies of cultivators at lower elevations. Although patchy, and limited by methodological problems of identification, the evidence from India suggests that pastoralism spread amongst hunterforagers of

the semi-arid scrub/savannah zones during the mid-Holocene prior to the emergence of agriculture.

Investigating where pastoralism began and where it then spread largely relies on archaeological evidence either of the process of domestication or the local introduction of domesticates. Animal and plant domestication represent qualitatively different phenomena although they share a number of features. While domesticated animals differ from their wild progenitors morphologically, genetically and behaviorally today, this could not have been the case throughout prehistory since it represents the result of genetic selection under human influence. The beginnings of herding cannot be simplistically sought by finding the earliest "domestic" bone remains but the presence of clearly morphological domesticates provides a minimum age for the processes of management that lead to those changes.

Relatively few animal species have been domesticated when compared with the range of plant species, though together domesticated plant and animal species represent a tiny fraction of the earth's biodiversity. Moreover, several of the centres of plant domestication were centers of animal domestication, notably southwest Asia and the tropical Andes, as shown in Figure 2. in several places.

Southwest Asia is still considered a major center of domestication. According to Davis (100), the domestication of all these animals occurred between 10,000 and 7,000 years ago. The ancestors of the domesticated sheep, goat, cattle and pig are thought to be the mouflon, bezoar goat, auroch and wild pig respectively. In the case of domesticated cattle, there is biomolecular evidence based on the analysis of the mDNA sequences in the modern species in Africa, Europe and Pakistan that indicates that there were at least two centers of domestication (101). One of these was probably southwest Asia whilst the other was in Pakistan.

The wild ancestors of these animals were all hunted prior to domestication all over the Middle Asia, including the Levant and Baluchistan, along with other species such as the mountain gazelle, though the latter was never domesticated. Even after the domestication of cattle, sheep, etc., wild animals remained an important supplementary source of protein. According to West and Zhou (102), the chicken is the earliest domesticated bird; this originated in southeast Asia from the red jungle fowl, for which there is genetic evidence. From here it was introduced to China and Europe *ca*. 4000 years ago. Another animal domesticated in Asia is the water buffalo. Mitochondrial DNA analysis indicates that there were at least two separate centers of domestication. One such centre may have been the Yangtze River delta where the oldest remains of water buffalo in China have been found and which are dated to *ca*. 6,000 years ago. The other center could be on the border of Sindh and Baluchistan.

In Pakistan we do not know when domestication of plants and animals took place and when foragers turned to become agriculturists but we do know where. Our earliest evidence for domesticated plants and animals come from Mehrgarh. This evidence clearly shows that wheat, barley and some pulses were domesticated there before 7000 BC or acquired from the West in domesticated form prior to this date. Domestication of sheep, goat, and possibly cattle was most likely undertaken during the same time period from where they were transmitted to the West. We shall discuss this topic in some details in Section V.

Agriculture and animal domestication is one end of a gradient of human interaction with plants and animals. Ethnographic studies have shown that procurement of food by hunter-gatherers often involves different degrees of manipulation of organisms and their environments. These may range from almost incidental effects such as the dispersal of seed during harvesting to large-scale environmental manipulation by burning vegetation to increase yields of game or seeds, recorded

ethnographically in Australia, Africa, and the Americas. Small-scale cultivation of wild plants is also known.

Identifyingearlydomesticatesandlinking them to particular geographical areas is still a major challenge for archaeologists. There are two main reasons for this: first, that early archaeological sites and the evidence they contain are usually less well preserved and difficult to date; second, that there are relatively few excavated sites over what are usually long periods of prehistory. There is evidence from a number of areas, such as late Jomon, Japan, that agriculture can initially form a relatively minor part of food procurement systems, and key variables associated with agriculture, such as population increase, only comes into play once agriculture has been more fully adopted. The same situation seems to exist in Baluchistan as well. In contrast, agriculture in the Near East seems to have spread fast, as an identifiable Neolithic "package." There is the question whether the evidence from South-West Asia, the area that has been very extensively researched as opposed to other regions where research has been only spotty, truly represents the actual situation. It is very well possible that this lop-sided research has served its own selffulfilling prophecy, designating region of South-West Asia as the Hearth of Domestication. Clearly generalizations about the impact of agriculture on huntergatherer societies may be hard to sustain on a cross-cultural basis.

Geography of Plant Domestication - Centers of Origins, Nuclear Zones, and the Hearths of Agriculture: A Legacy of de Candolle and Vavilov: No consideration of agricultural origins would be complete without mention of Alphonse de Candolle and Nikolai Vavilov. Although neither of them maintained elaborate theories about why or how agriculture originated, they were both concerned about the geography of plant domestication and crop origins. de Candolle lived in Geneva and was one of the foremost botanists of the 19th century. His book, *Origin of Cultivated Plants* (reprinted in 1959), was primarily an academic and intellectual exercise. He was interested in geography of plants in general and wrote extensively on the subject. He attempted to locate the region of origin of a good many cultivated plants by any means he could. He investigated the distribution of wild relatives, history, linguistic derivatives, archaeology, variation patterns, and every other clue he could think of.

In many respects there was not a great deal known in de Candolle's time. Archaeological plant remains were largely confined to materials from the Egyptian tombs and the Swiss lake dwellers. Wild races of a number of plants were not then known, and some of his information was faulty. Neverthe


Alphonse de Candolle

less, his book remains today a model of scholarship and continues to be a useful source of

information about the origins of cultivated plants.
Nikolai Vavilov was a Russian geneticist and agronomist in charge of an enormous National Institute of Plant Industry. At his disposal were dozens of experiment stations scattered over the Soviet Un

ion, staffed with thousands of professional and sub-professional workers. He proposed one of the most dazzling and ambitious plant breeding programs ever attempted. It was his plan to collect and assemble all of the useful germplasm of all crops that had potential in the Soviet Union, to study and classify the material, and to utilize it in a national plant breeding effort. A vigorous, worldwide plant exploration program was launched, and for the first time a really systematic plan for genetic resource management was established.

Vavilov was interested in origins because he was interested in genetic diversity, and he thought the two were related. In 1926 he wrote an essay, dedicated to Alphonse de Candolle, in which he proposed that one could reliably determine the center of origin of a crop by an analysis of patterns of variation. The geographic region in which one found the greatest genetic diversity was the region


Nikolai Vavilov

of origin. This was especially true if much of the variation was controlled by dominant genes and if the region also contained wild races of the crop in question.

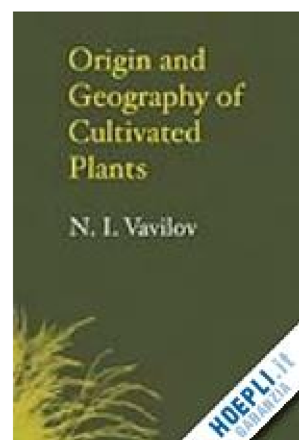
In this essay, he proposed eight centers of origin with some sub-centers. These areas came to be known as the Vavilov Centers of Diversity or simply, Vavilov Centers. The main proposed loci of origin were: southwest Asia, southeast Asia, Mesoamerica, the tropical Andes, sub-Saharan Africa and northeast North America, and possibly the southern Andes, and the Horn of Africa. These lists are being continually updated; one group of opinions recognized only three independent centers of domestication, namely, south-west Asia (the area that extends from the Mediterranean to the Indus Valley), China, and Mesoamerica. Some researchers even want to do away the concept of the ‘centers’ altogether. Until recently, the earliest dates were from sites in southwest Asia, notably for the domestication of wheat and barley *ca*. 10,000 years BP (25) but new evidence from China may push back the initial domestication of Asian rice to *c*. 11,000 years ago.

While data to support his centers of origin theory were not provided at the time, an enormous amount of information was generated by the Institute (now called the N.I. Vavilov Institute of Plant Industry or VIR), and published in the *Bulletin of Applied Botany and Plant Breeding* from about 1920 to 1940. These studies are old now, but when a student wished to study a crop, he or she is always advised that he or she turn first to the VIR publications. In recent years, several analyses of world collections or parts of world collections have been made and published, especially in wheat, rice, barley, maize and

other major crops for which large collections are available.

As a central concept, Vavilov proposed that the areas of high diversity indicated the regions where domestication of these crops began. Although this hypothesis is still subscribed widely, the Vavilov thesis of centers of domestication or origin is increasingly coming under attack - not only for its details but for its basic tenants. In fact, Vavilov conceded himself that his method of "differential phytogeography" did not work very well. He invented the concept of secondary centers to account for the fact that centers of diversity are not the same as centers of origin. The variation in secondary centers is often much greater than in the centers of actual domestication where these can be located on independent evidence. He also developed the concept of secondary crops; these are derived from weeds of older, primary crops. Rye and oats were cited as examples. According to this scenario, as agriculture spread from the Near East and Mediterranean centers toward northern Europe, weed rye and weed oats were carried along as contaminants of the barley and emmer fields. In due course domesticated races developed, far removed from the original homeland of rye and oats. Edgar Anderson later based his idea on Vavilov's writings that crops were often derived from weeds.

Apart from the criticism constantly levied on Vavilov, a considerable body of archaeological and paleobotanical evidence has evolved in recent years which does indicate a few primary regions where plant domestication and agriculture could first have occurred. Moreover, the application of radiocarbon age determination has allowed a chronological sequence of events to be constructed.The current picture of plant domestication is likely to be some of a mosaic, since people in different parts of the region found it advantageous to intensify their cultivation of locally available species at different times.



"centers" one can trace an intellectual thread forwards to Porteres' "cradles of ancient agriculture", Sauer's "hearths" of agricultural innovation, Harlan's and Hawkes's "nuclear centers" of agriculture and civilization, and Bellwood's "agricultural homelands". So pervasive has been the concept of centers that there can be few students of early agriculture who have not been influenced by it, although it has increasingly been criticized, particularly on genetic grounds, for example by Zohary and his colleagues (38).

The main weakness of Vavilov's concept has always been his equation of centers of crop diversity with centers of earliest agriculture. The recognition that areas of varietal diversity of crops

Present information indicates that cultivation of cereals began at a non-intensive level, called "pre-domestication level". This means that methods of cultivation and harvesting were not sufficiently intensive as to induce change in a domesticated species in the early aceramic Neolithic period, or

even at the very end of the Epi-paleolithic period, from southeast Turkey through western Syria to Israel and the Jordan Valley. No modern study of diversity has confirmed the intuitive geographic patterns described by Vavilov. Some concentrations of diversity can be detected, to be sure, but they have little or nothing to do with origins. For example, scientists used the Cambridge barley collection, recording 12 qualitative and 18 quantitative traits averaged over 3 years, for more than 100,000 observations and concluded the greatest diversity in barley is in USA, followed by Turkey, Japan, USSR, and China. Afghanistan is 16th and Ethiopia 18th. There was no real center with geographic integrity. Other studies have given similar anomalous results.

Despite these anomalies, the concept of centers of origin of cultivated plants and animals, originally introduced by Vavilov, has thoroughly permeated discussions of early agriculture. Vavilov initially delineated five, later eight, and still later up to twelve world centers of origin of cultivated plants. Although experts differed on the identification of individual centers of origin, the concept of a ‘center’ has exerted a particularly strong and persistent influence on Western scholars from 1945 onwards (37). It is, therefore, advisable to spend some time here and briefly examine as to what is really involved.
were much more extensive than his original centers led his successors to distinguish between primary and secondary centers, the need for which he had himself anticipated. Thus, Zhukovsky, who, like Vavilov before him, was Director of the Institute of Plant Industry in Leningrad, introduced the concept of "primary gene microcenters",

As mentioned above, Vavilov argued that the centers of origin of cultivated plants were to be found in the areas of greatest varietal diversity, and that mountainous regions were more likely to be the "the home of primeval agriculture". He rejected the notion that the concentration of crop varieties that he observed in such regions was the result only of the diversity of environmental conditions in the mountains, arguing that it was also the result of "historical facts". He even suggested that "in locating the centers where cultivated plants have originated we come near to establishing the principal homesteads of human culture". From Vavilov's which contained the
wild relatives of the cultivated species and which he con trasted with "secon dary gene megacen ters". The latter were in effect Vavilov' s centers expanded to include most of the world, and they con sisted of the vast areas to which culti vars have been dis persed and in which much varietal diver sity has since arisen

THE INTERNATIONAL SCIENTIFIC SERIES.

ORIGIN OF

CULTIVATED PLANTS.

BY

ALPHONSE DE CANDOLLE,

FOREIGN ASSOCIATE OF THE ACADEMY OF SCIENCES OF THE INSTITUTE OF FRANCE; FOREIGN MEMBER OF THE ROYAL SOCIETIES OF LONDON, EDINBURGH, AND DUBLIN; OF THE ACADEMIES OF ST. PETERSBURG, STOCKHOLM, BERLIN, MUNICH, BRUSSELS, COPENHAGEN, AMSTERDAM, ROME, TURIN, MADRID, BOSTON, ETC.

NEW YORK:
D. APPLETON AND COMPANY,
1, 3, AND 5 BOND STREET.
1885.

(39).

The value of
Zhukovsky scheme was to distinguish clearly between centers of *origin* of cultivars (his microcenters) and regions of crop diversity (his megacenters), but his work had little impact on Western scholars. This contrasts with the wide influence of a paper by another re-interpreter of Vavilov's scheme, Harlan, who published his version of it in 1971. He argued that only three of Vavilov's centers merited recognition as such, on the grounds that agriculture had originated independently in each of them. He further proposed that most of the remaining Vavilovian centers

should be subsumed in three tropical non-centers that were conceived as large areas of diffuse crop origins, each linked by processes of diffusion to its nearest subtropical or temperate centre to the north; thus, Africa was paired with Southwest Asia (the Near East), Southeast Asia with North China, and South America with Mexico (39).

In 1983 a similar but more complex revision of Vavilov's centers was proposed by Hawkes, who postulated four "nuclear centers of agricultural origins" (the Near East, northern China, southern Mexico, and central to southern Peru), associated with ten "regions of diversity" to which "domesticated plants spread from the nuclear centers" and eight outlying "minor centers, probably of more recent origin, where only a few crops seem to have originated". Harlan's revision of Vavilov's scheme was based on the assumption that agriculture arose independently in three ‘nuclear’ centers of ancient civilization from which it subsequently spread to the three non-centers - an assumption that cannot be substantiated unequivocally from present archaeoters, probably of more recent origin where only a few crops seem to have originated" (40).

In examining independent centers of domestication around the world, it's important to realize that the domestication of one local species or two would not necessarily trigger the enormous biocultural consequences we usually associate with the Neolithic period in the Near East. In fact, most



logical and botanical evidence. In 1983 a similar but more complex revision of Vavilov's centers was proposed by Hawkins, who postulated four "nuclear centers of agricultural origins" (the Near East, northern China, southern Mexico, and central to southern Peru), associated with ten "regions of diversity" to which "domesticated plants spread from the nuclear centers" and eight outlying "minor cen



Currently well-accepted and possible centers of agriculture origin (*Jared Diamond*)

altered species retained only local significance. For example, in the Eastern Woodlands of the United States, hunter-gatherers domesticated several small-seeded species very early; still, the wild forest products obtained by hunting and gathering retained their primary importance until relatively late prehistoric times, when true farming developed in the East. The prehistoric yam cultivators of subSaharan Africa serve as a similar example, so does South India where the domestication of a few pulses did not make much of an impact on the overall character of the ensuing agriculture based on the Fertile Crescent package.

The concept of center of origin has evolved since Vavilov's time. Basically, what Vavilov did was to draw lines around areas in which agriculture has been practiced for a very long time and in which indigenous civilizations arose. The geography of crop variation depends a lot upon the geography of human history. When one actually analyzes origins of crop by crop, it becomes apparent that many of them did not originate in Vavilovian centers. Some crops do not even have centers of diversity. The pattern is much more complex and diffuse than Vavilov had visualized. In the case of the Near East, we seem to have a definable center in the sense that a number of plants and animals were domesticated within a relatively small region and were diffused outward from the center. In Africa, nothing of the sort is apparent. The evidence seems to indicate that activities of plant domestication went on almost everywhere south of the Sahara and north of the equator from the Atlantic to the Indian Ocean. Such a vast region could hardly be called a "center" without distorting the meaning of the word. In North China, there seemed to be fairly convincing evidence for a center, but nothing of the sort is evident in Southeast Asia and the South Pacific. The pattern may be similar in the Americas with a center in Meso-america and a non-center in South America.

Although Vavilov's successors have elaborated and refined his original concept, and have tried to

distinguish more clearly than he did between centers of crop diversity and areas of origin of agriculture, conceptual confusion between these two phenomena persists. Nor does the evidence everywhere support the assumption that plants were domesticated and agriculture developed earlier in all the so-called nuclear centers than elsewhere. As Harris proposed (92), rather than continue to try to define, for the world as a whole a series of "primary" and "secondary" centers of plant domestication and early agriculture, we need to focus research more on the evolutionary history of individual crops and regional crop associations. The same reasoning applies to research on the origins of domestic animals. It is satisfying to note that this advice is being heeded now.

In most regions, agriculture didn't develop fully until people were exploiting a mosaic of plantsand sometimes animals, too - from different locations, brought together in various combinations to meet such cultural requirements as nutrition, palatability, hardiness, yield, processing ease, and storage. In ‘Middle Asia’, this threshold was reached around 10,000 years ago, when an agricultural complex consisting of
sheep,goats, and cattle
wheat, barley, chickpea,

was widely and rapidly adopted. Many of these plant species tend to grow in regions where a very long dry season follows a short wet period. After the last Ice Age, around 10,000 years ago, these conditions existed around Middle Asian region - Mediterranean basin and the hilly areas of the Near East and the slopes of the Iranian Plateau in southern Turkmenia, norther Afghanistan and eastern Baluchistan. Domestication of individual plants and animals could have happened independently at different points in this vast region but they needed to coalesce into a usable agricultural package, a process that was facilitated by a strong cultural interaction between the various peoples living in the above mentioned ‘Middle Asia’. Thus, keeping the Vavilov’s legacy alive, Baluchistan and Turmenia were as much a center of agricultural origin as the Levant or the Zagros. We shall discuss this concept a little further in Chapter V.5.

Discussion of the validity and value of the concept of centers of origin of domesticates in investigating the origins and spread of agriculture raises another, more difficult, problem. This is the question of the relative importance, or frequency, of single or multiple domestications of the same, or closely related, taxa. If it can be determined whether a particular plant or animal was domesticated once only, or several times in different areas, we can gain important insights into the early history of agriculture and pastoralism. We need to be able to answer that question for each crop and domestic animal, but to do so we must know the identity of the wild progenitors and be sufficiently confident about their distribution at the postulated time or times of domestication to draw well founded conclusions about where the process occurred.

The question of single versus multiple origins of domesticates cannot be answered at a general level: detailed biological and archaeological investigation of individual taxa is required, region by region. This continue to be a major part of the research agenda for the study of "agricultural origins". It is explicitly examined, for example, by Zohary who argues persuasively for single or only very few "domestication events" in the development of grain agriculture in Southwest Asia, by Blumler who suggests that this holds true for most "primary" crops, and by Uerpmann who suggests that a unique constellation of circumstances in the "proto-neolithic villages" of the Levant led to the domestication of sheep and goats.

We encounter another major difficulty: the question of whether environmental changes have so altered those areas of distribution since the time of domestication as to invalidate inferences based on the modern distributions of the wild progenitors. This problem raises particular difficulties in regions that experienced major environmental changes at and after the Pleistocene-Holocene transition, such as Southwest Asia.

Conclusion: As seen in the foregoing, there are no easy answers to central questions about domestication and beginning of agriculture. It is no wonder that for more than 100 years this area of inquiry has held the attention of archeologists working world-wide and representing all of archeology's many and rapidly increasing sub-disciplines. It is a research domain that carries broad currency with scholars based in biological and physical sciences, social sciences, and humanities. It is a topic that captures the imagination of a public interested in how the familiar world around them came to be. It is a problem that truly matters. With an enhanced understanding of the nature of the problem and an expanding array of powerful tools for studying it, there has never been a time of greater promise for pursuing challenging questions about the origin and diffusion of domesticates and agricultural economies in virtually all areas of the globe (29).

Talking in generalities, it seems fairly certain now that domestication of plants and animals started independently in several places at different times. Evidently only certain groups of wild plants were domesticated and it has been variously shown that certain families of plants, especially grasses and legumes have contributed major crops in Asia and Europe. Vavilov claimed that all the major crops originated in the tropical to sub-tropical regions of the world, and in seven to twelve centers of origin, based on his concept that centers of diversity could be equated with centers of origin. Vavilov further added that the origins of plant domestication were to be found in mountain zones in these centers but modern research gives indication that this was probably an over-simplification. Later thinking, however, confined the 'origins' of domestication and agriculture, at least so far as the principal species are concerned, to three great regions, in which certain plants grew, regions which had no communication with each other. These are China, the southwest of Asia (including Egypt and the area up to the Indus Valley), and Mesoamerica.

An essential element in the concept of the 'centers" of agriculture, or other terms meaning the same thing, is that in most areas where agriculture emerged, early farmers relied on local plant species whose wild relatives grew close by. Old World cereal grasses, including barley and some wheat varieties, were native throughout the Near East, Central Asia, northern Iran, Baluchistan, and perhaps into Tibet on one hand and southeastern Europe on the other. Wild varieties of these plants still flourish today over parts of this range. The same is true for the ancestral stock of animal species from which modern goats and sheep have originated. Therefore, the domestication of barley or wheat as well as goats and sheep could have occurred anywhere in this region, possibly more than once. This leads us to the Possehl's concept of the "expanded Nuclear Zone" - the nuclear zone of the 'Middle East' expanded to the vast area of 'Middle Asia', encompassing not only the West Asia, but also norther Iran, Eastern Turkey, Central Asia, Afghanistan, and Baluchistan.

We can establish quite clearly that cultivated plants arose from a rather restricted number of plant families but not in restricted areas of the globe. This does not imply, however, that man did not *utilize* all kinds of plants in every area in which he lived. Quite the contrary. All archaeological and ethnobotanical evidence shows clearly that both primitive and relatively advanced peoples have gathered and eaten or otherwise utilized all manner of wild plant products from time immemorial.

Even today, we still gather plants, though much less so in our highly industrial urbanized life than was so a hundred years ago. However, the majority of wild plants gathered by mankind have remained firmly wild and have never been domesticated.

It appears that there must have been, in the ancestors of the domesticated plants some special attribute which induced their cultivation. Alternatively, one might postulate that there was some attribute of the peoples of those regions which promoted the invention of agriculture there and nowhere else. Hawkins (42) has develop the thesis that we can look for the basic causes in the plants themselves. Alternative "deterministic" hypotheses which seek to explain the origins of agriculture by postulating a certain stage of mental or sociological development in the peoples concerned or by progressive desiccation of the regions where they lived have are still talked about but are receiving not much support lately.

We also know that not all the wild plants and animals that were eventually domesticated in a given area were domesticated simultaneously. Even in the cases of the most rapid independent development of food production from a hunting-gathering lifestyle, it took thousands of years to shift from complete dependence on wild foods to a diet with very few wild foods. In early stages of food production, people simultaneously collected wild foods and raised cultivated ones, and diverse types of collecting activities diminished in importance at different times as reliance on crops increased. The underlying reason why this transition was piecemeal is that food production systems evolved as a result of the accumulation of many separate decisions about allocating time and effort. Foraging humans, like foraging animals, have only finite time and energy, which they can spend in various ways.

III.2. Origins of Agriculture and Animal Herding



It must be clear from the foregoing pages that from about 10,000 years ago, groups of people in several areas around the world began to abandon the foraging lifestyle that had been successful, universal

and largely unchanged for millennia. They began to gather, then cultivate and settle around patches of cereal grasses and to domesticate animals for meat, skins, wool, and other materials, and milk. The era of food production had begun. Farming, based predominantly on wheat and barley, ostensibly first appeared in the Middle East, and spread quickly to western Asia, Europe, Central Asia, and the Greater Indus Valley. The earliest civilizations all relied primarily on cereal agriculture. Cultivation of fruit trees began three thousand years later and vegetables and other crops followed. Cultivation of rice probably began in China about 7000 years ago and in Pakistan most likely around 4,000 years ago. In some areas of the known world the art of agriculture reached rather late. In this respect, peninsular India is a case in point, here agriculture began in the second millennium BC, although the evidence for pastoralism is from somewhat earlier date.

At approximately the same time that agriculture emerged out of gathering, a parallel specialization appeared, that is, the herding of domesticated animals. The presence of goat, sheep, and cattle has been archaeologically attested in Pakistan and Central Asia long before their domestication by man anywhere in the world, including the Near East. Judged from the bones found in some huntergatherers camps in Central Asia, the cave dwellers of northern Afghanistan and those found in the early settlements of Baluchistan, the utility of goat and sheep as a source of food was quite wide spread. It is, however, difficult to say absolutely if these bones belonged to the wild or the recent domesticates.

The inception of permanent agriculture was a major turning point in cultural history of the Old World. It represented the increasing ability of humankind to manipulate other organisms. This ability to channel food energy paved the way for many subsequent technological and cultural changes, including the invention of pottery and metal technology as well as changes in the structure and organization of human communities. It is no coincidence that the areas where agriculture first developed were also the home of early civilizations. The questions of how, when, where and why people first domesticated plants and animals, and abandoned the foraging life for that of farming, are, therefore, central to an understanding of the history of humanity.

Although the reasons for the origins of agriculture are still the subject of speculation, there is no doubt that agriculture has the potential to be more productive than foraging. In this case, productivity is not only a matter of yield, but also of producing predictable crops that can be easily stored. Agricultural systems also have the important property of spreading easily, even into areas that were marginal for the wild ancestors of the crops and animals concerned: for example, wheat and barley have spread over most of the temperate world, although their wild ancestors are restricted to their Middle Asian homeland. Agriculture has therefore had an important role both in supporting higher populations and in extending areas of human settlement.

The transition to agriculture not only had revolutionary ecological and economic consequences, it was also associated with the development of settled life and it led ultimately (in some parts of the world) to the emergence of urban civilization. The Near East has accumulated a large database on the wild progenitors of the present-day domesticates and the archaeological evidence to support the relevant hypotheses for the origins of agriculture. The research in other areas of the Old World is, however, wanting.

Progress in understanding the transition from hunting-gathering to agriculture depends on multidisciplinary investigations - to which archaeologists, anthropologists, biologists, geographers

and other scientists have all contributed. As a field of scholarly enquiry it has a pedigree that reaches back at least to the second half of the nineteenth century, in such pioneering works as those of Darwin (1868), Heun (1870), de Candolle (1882) and Hahn (1896). It was given fresh impetus in the early twentieth century by two seminal statements, one by a botanist (Vavilov 1926) and one by an archaeologist (Childe 1928), which, respectively, introduced the concept of "centers of origin" of cultivated plants (and, by extension, of agriculture) and formulated the concept of the Neolithic (or Agricultural) Revolution. Both these contributions profoundly influenced subsequent thinking about, and investigations of, the origins of agriculture, and that they continue to do so, directly or indirectly, is evident in many of the pages in this book.

After the Second World War, archaeologists started specifically to investigate the beginnings of agriculture in the field, and to involve botanists and zoologists in their endeavors. Such multidisciplinary projects were pioneered by Robert Braidwood in Iraq and by Richard MacNeish in Mexico, and these were followed in the 1950s by other excavations of early neolithic/agricultural sites, principally in the Near East (Southwest Asia), for example those carried out by Kathleen Kenyon at Jericho and by James Mellaart at Hatyilar and Huyuk in Turkey. By the 1960s the search for "agricultural origins" had become a prime preoccupation of many archaeologists, and it took center stage in the "processual" revolution of that decade, particularly in transformation of thinking about the beginnings of agriculture, encapsulated by Binford when he asserted that "the question to be asked is not why agricultural and food-storage techniques were not developed everywhere, but why they were developed at all"; and it introduced into the debate not only systems theory but more general ecological concepts, which were employed at that time by British students of the subject as well as by the "New Archaeologists" on the other side of the Atlantic.

Although the pursuit of "agricultural origins" has lost much of its intellectual glamor since the heady days of the late 1960s and early 1970s, it has remained a major focus of archaeological research and has continued to generate many international conferences and symposia as well as several comprehensive individual studies. A large number of books have since appeared and this procession of publications contains an impressive volume of new data on early agriculture and plant and animal domestication, but, more significantly, it also reflects a shift away from the search for ever earlier evidence, in the form of the oldest dated cereal grain or domestic caprine bone, to an attempt to trace transitions from "hunting and gathering" to "agriculture" in all their ecological and cultural complexity in particular regions of the world. This research agenda is also increasingly being aided by the application of a wide range of new scientific techniques to the retrieval, identification, dating and analysis of plant, animal and human remains and the archaeological contexts in which they are found.

To understand better the processes by which agriculture originated and spread, we need to examine the evidence in broad, explicitly comparative frameworks, particularly because there is a tendency for the results of individual excavations to be interpreted in terms of local cultural sequences, with insufficient comparison made with evidence from other areas. Ideally, and eventually, such comparison should be carried out at a global scale, but at present there is insufficient evidence worldwide to justify attempting such an ambitious enterprise. We are likely to gain greater understanding of these complex processes by examining, in depth but not in complete isolation, the evidence currently available for each of the major continental landmasses: Eurasia, Africa and the Americas.

At present, less is securely known about the origins and spread of agriculture in Pakistan than in the Middle East and Europe, where investigation has concentrated particularly on Southwest Asia and on the postulated spread of agriculture from there to and through Europe. We know even less about the beginnings of agriculture in India and Central Asia, but in recent years investigations in South India, have produced sufficient new data to justify an attempt to compare, and partially at least even to synthesize, the evidence for the subcontinent as a whole.

The UNESCO-sponsored volume on the *History of Mankind*, written by the wold's renowned archaeologists, teaches us that: "At least it can be said that there is no longer any serious doubt that the earliest centers for both agriculture and stockraising lay in South-West Asia, well within that Eurasian theatre that has seen all man's leading initiatives since the beginning of Upper Paleolithic times." This statement represents a well-accepted point of view for the origins of civilization and has lately transformed into an archaeological dogma. Well, as will be shown in the following pages, our knowledge about the Neolithic in other parts of the world has since advanced quite a bit and this Eurocentric position is being increasingly challenged. These arguments have been summarized in the last chapter of this Section (Chapter IV.3) and alternatives offered. The ancestors of emmer wheat and two-row barley, apparently the cereals first to be cultivated, have a wide range from Palestine to Persia and Afghanistan all the way up to Pakistan, even up to Tibet; the Asian mouflon sheep, the ibex and the urial seem to have been the precursors of the earliest domesticated herds; their area of spread is equally large and wide-spread all the way from eastern Turkey to Pakistan. It appears that the fringes of the Iranian Plateau, especially a few nodes in the hilly flanks of the mountain range bordering Iran and Iraq, similar outward slopes of the Alburz mountain range bordering Iran and Turkmenia, and the Kachi plain on the eastern end of the Plateau in Baluchistan are more important than any one 'cradle' of agriculture.

A distinction can be made between societies in which a small amount of food is obtained through animal and/or plant domestication and those which obtain a significant or substantial amount of food through these activities. It is the latter that can be described as food producing societies. A working definition of a food-producing society is one which meets at least half its food needs for at least part of the year through the cultivation of domesticated plants and/or the managing of domesticated animals in a context wherein animals and plants are not tied to their natural habitat. Of course, since precise statistics are unavailable for ancient societies, the extent to which a group depended on domestication for its food can only be gauged indirectly.

Within Middle Asia, an area that spans from the eastern shores of the Mediterranean to the banks of the Indus and from the slopes of the hilly flanks of the Zagros mountains to the northern slopes of the Alburz, the research for the early centers of agriculture is narrowing. They were certainly not in the flats of the great rivers of the Tigris and Euphrates or the plains of the mighty Indus where agriculture was later to come to full fruition. A consensus is, therefore evolving according to which the centers of agriculture should be sought on the 'hilly flanks' of the Iranian Plateau. This could be the southern Caspian basin or the high Anatolia and farther Iranian plateau, even the trans-Caspian Timken, Afghanistan and Baluchistan. According to this view, these centers should be sought along the western parts of Iran, eastern end of the Mediterranean from Palestine and western Jordan, through Lebanon and Syria to southern Turkey, southern Turkmenistan, northern Afghanistan and Baluchistan. The Levant was certainly very much involved in this momentous revolution but it is not the only region for such a consideration. Its prominence largely stems from the extent of research conducted there. These issues will be further examined in the ensuing discussion.

Humans have occupied this planet for several million years, but for almost all of that period they have lived as foragers, by various combinations of gathering, collecting, scavenging, fishing, and hunting. The first clear evidence for activities that can be recognized as farming is commonly identified by scholars at about 10,000 years ago, at about the same time as global temperatures began to rise at the end of the Pleistocene (the 'ice age') and the transition to the modern climatic era, the Holocene. Subsequently, a variety of agricultural systems based on cultivated plants and domesticated animals has replaced hunting and gathering in almost every corner of the globe. Today, a relatively restricted range of crops and livestock, first domesticated several thousand years ago in different parts of the world, feeds almost all of the world's population. A dozen crops make up over 80 per cent of the world's annual tonnage of all crops: banana, barley, maize, manioc, potato, rice, sorghum, soybean, sugar beet, sugar cane, sweet potato, and wheat (6). Only five large (that is, over 100 pounds) domestic animals are globally important: cow, sheep, goat, pig, and horse, and perhaps camel and donkey. Although the reasons for the spread of agriculture are still the subject of speculation, there is no doubt that agriculture has the potential to be more productive than foraging. In this case, productivity is not only a matter of yield, but also of producing predictable crops that can be easily stored. Agricultural systems also have the important property of spreading easily, even into areas that are marginal for the wild ancestors of the crops and animals concerned: for example, wheat and barley have spread over most of the temperate world, although their wild ancestors are restricted to their Middle Asian homeland. Agriculture has therefore had an important role both in supporting higher populations and in extending areas of human settlement.

Farming was not the dominant mode of subsistence in many parts of the world until several thousand years after the original domestication of particular plants and animals. Hence most research in Europe, Africa, Asia, and the Americas has focused on questions about processes of 'agricultural dispersal': did farming begin in such regions because the idea of farming was somehow disseminated to the local foraging population from one of the primary farming zones? or because new people - farmers - physically moved into the area from a primary farming zone? Or, did the local foraging population turn to farming by themselves, unaffected by outside influences, and if so, why?

It is generally true that the introduction of agriculture is linked to an increase in population and in the number and size of sedentary villages. This is particularly clear in the case of the spread of the Neolithic package of crops and domesticated animals ostensibly from the Near East into Europe and to Central Asia and the Indus Valley.

The first region in world prehistory for which we have extensive evidence for a shift from a hunting and gathering way of life to farming and animal keeping is from the Near East between 10,000 and 8,000 years ago. The main domesticated plants were cereal grasses (rye, wheat, and barley) documented over an area that extends from the eastern Mediterranean to southern Turkey, Syria, Iraq, and western Iran, and generally known as the Fertile Crescent. Domestication of sheep, goats, and cattle followed closely on the heels of the adoption of domesticated plants in the same region or the regions around it. In contrast to the Near East, the research in Eastern Iran, South Asia, Afghanistan, and CEntral Asia has been spotty and no site of preagriculture settlement has so far been discovered. The earliest site is Mehrgarh in Baluchistan and this dates back to the time period when humans in this part of the world were already agriculturists. This means that we are missing the archaeological record that could shed some light on the early stages of agricultural development at par with that of the Near East. The situation in Central Asia is similar. Thus, there is no means to ascertain as to when the process of domestication and settled life got started in these regions.

Since the evidence for the early stages of plant and animal domestication is not yet available in the Greater Indus Valley, and since the first evidence of agriculture and domesticated animals goes back to only post-Levantine times (sometime between 10,000 and 8,000 years ago), the question is raised whether the plants and animals were 'imported' to Baluchistan and Central Asia in already domesticated form, as is generally believed, from the Near East, or whether they were domesticated indigenously from the local progenitors. The earliest domesticated plants evidenced at Mehrgarh included barley and wheat and the domesticated animals included sheep, goats and cattle. These were precisely the domesticates that were found in the Near East. This gave a strong reason to conclude that the domestication of plants and animals in these two regions were somehow connected. Furthermore, since there was no archaeological site at hand in Baluchistan or Central Asia prior to or contemporary with those in the Near East, the domesticated plants and animals must have "diffused" to Eastern Iran, Central Asia and Baluchistan from the Near East, which was then dubbed as the 'cradle of agricultural revolution'.

The problem, however, emerged when the wild progenitors, from which the domesticated species of plants and animals ostensibly evolved, were found to exist in Baluchistan and Central Asia as well. Complicating the situation further, some newly available carbon dates in the Fertile Crescent, the reassessment of the artifacts found at various sites, and the shedding off the Gordon Childe's analytical cloak by archaeologists, compelled some to reexamine the doctrine of the Levantine Primacy. This critical examination got additional boost when some carbon dates from Mehrgarh were reported that corresponded to those from the Levant. The conventional wisdom regarding the Near Eastern Hearth of Civilization still prevails but it is increasingly coming in question. We shall revisit this debate in due course.

In view of this situation, the 'origins' of agriculture and animal domestication in South and Central Asia as well as in the Near East has become a tantalizing subject of research and speculation. It pertains not only to "where" and "when" but also "how" and "why". Archeological expeditions in the Near East, China, Pakistan, and elsewhere have unearthed specimens of man's earliest crops. Botanists have argued over what the specimens mean. Geographers have analyzed the ranges of the wild ancestors of today's crops, and told us where they should originally have been domesticated. Anthropologists have presented models for the way agriculture might have begun - some reasonable, some preposterous but still quite interesting.

Many authors who have written on the origins of agriculture and pastoralism or have researched in the domestication of plants and animals, stress in their interpretations of the evidence the importance of particular conjunctions of circumstances in particular places at particular times.The Fertile Crescent, or the Near East in general, figures most importantly in their treatments although South America and China are coming increasingly in focus. South Asia, along with Eastern Iran, Afghanistan and Central Asia, has generally been neglected. The result is that we presently know quite a bit about the origins and spread of agriculture in Southwest Asia and Europe than we know about any other region, ancient Pakistan included. We, therefore, compliment the locally available data with the evidence from Southwest Asia and try to apply it over the area where such evidence is lacking. This is a dangerous undertaking but exciting nonetheless.

The study of the beginning of agriculture is faced with an abundance of new data and a number of overviews, some in book-lengths. Many of them attempt comparative interpretations of the evidence which were available at the time. In what follows, a full use of this material has been made. The

evidence has been reviewed continentally and chronologically, rather than regionally. This we are leaving to a later chapter. It must be emphasized, however, that the temporal framework is not rigorously defined anywhere, partly because of the problems involved in interpreting radiocarbon dates, many of which suffer from contextual uncertainties. This applies to the Fertile Crescent as it does to Baluchistan and elsewhere.

The aim in this chapter is to attempt a partial - although highly compositional interpretation of the beginnings of agriculture and pastoralism in the Old World as a whole but always keeping in view the role of ancient Pakistan in this important transition. This is an imposing task, but one that is worth attempting to gain an overview as much of what we do not know as of what we more securely understand. This chapter is more descriptive and interpretative than theoretical and explanatory; these matters have been deferred to Chapter IV.3.

What is Agriculture? The published literature on "agricultural origins" is characterized by a confusing multiplicity of terms that define our discourse. There is little agreement about what precisely is meant by such terms as domestication, cultivation, agriculture, and animal husbandry. Most of the time these terms are used rather loosely and sometimes confusingly. It is true that we are dealing here with the origins of agriculture in prehistorical context and thereby can take liberty with this lax thinking and define these terms in the particular context that is at hand. This semantic confusion, however, militates against clear thinking about the phenomena we investigate, leads to misunderstanding, and can provoke unnecessary disputes over interpretation of the evidence. It is therefore instructive to clarify their meaning or at least their interrelationship

Domestication is a biological process that involves changes in the genotypes and physical characteristics of plants and animals as they become dependent on humans for reproductive success. Cultivation is the term that has been used most confusingly, its meaning often changing with the context. It is a cultural phenomenon that involves intentionally preparing fields, sowing, harvesting, and storing seeds or other plant parts. Cultivation required significant and deliberate changes in human technology, subsistence, and perspectives that lies somewhere between the concepts of domestication and agriculture. Herding, like cultivation, requires intentional changes in the relationship between humans and animals.

There are many definitions of the terms "agriculture" and "pastoralism" (33) but more general ones are probably the best for our purpose. Thus, agriculture can be seen as the practice of growing crops, whereas pastoralism involves raising livestock. Anyone who sows or harvests domesticated plants is involved in agriculture, just as anyone who husbands grazing or browsing animals is a pastoralist. More specifically, domestication can be defined as 'the evolutionary process whereby humans modify, either intentionally or unintentionally, the genetic makeup of a population of plants or animals to the extent that individuals within that population lose their ability to survive and produce offspring in the wild' (34).

Agriculture ultimately involves changes in the human use of the earth and in the structure and organization of human society - the widespread use of ceramic containers, the extensive clearing of forest, the cultivation of hard-shelled cereals that can be stored for long periods of time, the invention and adoption of new technologies for farming and/ or herding, more villages and more people, and an increased pace along the path to more complex social and political organization. Agriculture is the establishment of an artificial ecosystem in which selected species of plants and animals are cultivated

and reared. Its two basic premises are the intentional propagation of food (both plant and animal) by humans, and the isolation of the domesticated species from their wild relatives, leading to change (intentional and unintentional) in their morphology such that domestic species may be distinguished.

The agricultural practices, by which human communities abandoned their primary reliance on wild species and invested time and energy in clearing forests and constructing storage facilities in which the annual harvest could be stored, are usually associated with sedentism, a residence pattern of permanent, year-round settlement, which replaced the mobility associated with most huntergatherer groups. This generalization is based on certain ethnographic and archaeological evidence which showed that the appearance of agricultural systems were somehow linked to the appearance of sedentary villages. The distinction may, however, be simplistic, as certain non-agricultural communities in favorable locations already had relatively permanent settlements (see Section III).

There are differences between plant collection and plant domestication, and between animal keeping and animal domestication. When grain is harvested and *all* of it is consumed, this is a stage of food collection. If, after harvesting, some grain is consumed for food and the rest put aside and later intentionally planted, this is the stage of plant domestication.

When certain species of animals are captured and kept, this is a stage of animal keeping. When wild animals are removed from their natural habitat and maintained and bred under artificial conditions by people for their profit, this is the stage of animal breeding or domestication. In the *Shorter Oxford English Dictionary*, 'farming' is defined as 'the business of cultivating land and raising stock'. It is equated with 'agriculture', which is defined as 'the science and art of cultivating the soil, including the gathering in of the crops and the rearing of livestock', and is linked with 'domestication', described as the action of 'taming or bringing under control'.

The matter of definition now behind us, we continue our discussion on the principal topic, that is, the origin of agriculture. But before we begin, it would be interesting to see how different mythologies, religious beliefs, and old texts conceive and visualize the origin of agriculture. While the fallacy of all this is demonstrable, our mythologies and religious beliefs have profoundly colored our modern concepts in so many different ways. For example, it has been argued that vegetatively reproduced crops must be older than seed crops because it would be easier to think of; it would not occur to the savage mind that seeds could be planted. Another product of this way of thinking is the idea that domesticated could have happened only once and this point of origins must lie in the Levant, the “promised land” of the Bible.

Collection versus Cultivation: If wild wheats and barley were indeed collected in their respective centers long before they were domesticated, the question naturally arises as to whether we can distinguish between the collection stage and the advent of domestication. In other words, can we recognize domestication soon after it began? Biologically speaking, perhaps the best way to define domestication and to contrast it with the stage of collection is as follows: When a cereal is harvested and *all* the grain yield obtained is used as food we are dealing with a *collection stage;* when a cereal is harvested and later one part of the yield is used as food, while a second part of the grain is *intentionally planted* by man, we are dealing with *domestication.*

From the point of view of population genetics and considerations of selection pressures, these two situations are diametrically opposed. Under the system of collection the wild stands maintain themselves spontaneously, i.e. their existence depends entirely upon the wild mode of seed dispersal.

When wild stands are being harvested grains from the less brittle plants which constitute these populations have of course a better chance to be gathered by man while the more brittle plants donate relatively more seed for quick-shattering forms. By contrast, artificial planting would mean selection in exactly the opposite direction. Non-brittle mutants which were lethal in the first situation become advantageous under the second system. Compared to the brittle forms, they have a better chance of contributing their seed for subsequent generations. Genes for non-brittleness are thus strongly selected for by the system of harvesting-and-planting. Thus under domestication, one should expect establishment of non-brittle cereals whether or not the cultivator is conscious of this trait. Furthermore, theoretically, such a shift from brittle to non-brittle spikes should be fast, and if the planted populations of wheats and barley were large enough, it could have been accomplished in a matter of only a few generations.

In summary, the notion that man first discovered brittle mutants in wild cereal fields, realized their potentialities and subsequently introduced cultivation, is apparently a gross over-simplification. Non-brittle mutants were not the cause of domestication but rather an immediate result, the consequence of a change in the biological syst e m w h e n p l a n t i n g w a s introduced.The fact that several times both brittle and non-brittle cereals have been found mixed together, is not necessarily an indication that we are dealing with the real beginnings of domestication. Early farmers were no doubt both collectors and cultivators, and the collection of wild cereals could have added to the harvest obtained from the cultivated plots for a long time after the advent of domestication. The critical indication that cultivation was practiced is of course the presence of some non-brittle material.

Cosmological Views on Agricultural Origins: In the classical mythologies of all civilizations, agriculture is fundamentally of divine origin. It arrived in different ways from different deities and under various circumstances, but the underlying theme is recognizable. In the Mediterranean region, the source was a goddess, Isis in Egypt, Demeter in Greece, and Ceres in Rome. In China, it was the ox-headed god Shên-nung; in Mexico, Quetzalcoatl disguised as a plumed serpent or other animal. In Peru, perhaps Viracocha or perhaps the Inca, sent by his Father the Sun, was responsible. Contrary to this general view, in Judio-Christian-Islamic tradition, agriculture was a sort of punishment from God for the sins of man or his ungratefulness. Among the Hindus and the Buddhists it was the end of the Golden Age and the start of a dark age, the *Kaliyug.* The appearance of agriculture in mythology is frequently associated with other features of civilization: settled life, household arts, formal religion, and



Demeter stands holding a royal sceptre and sheaf of wheat. She wears a crown upon her head. Next to her is Persephone, holding an Eleusinian torch and pouring libations from a cup

government by laws. We also see that agriculture brought death and gods that demanded sacrifice in exchange for rain and abundant harvests. The general features of these stories can be grasped from the selections that follow.

According to early Greek storytellers, humans owe the ability to cultivate crops to the sudden generosity of a goddess. Legend has it that in a burst of goodwill, Demeter, the goddess of crops, bestowed wheat seeds on a trusted priest, who then crisscrossed Earth in a dragon-drawn chariot, sowing the dual blessings of agriculture and civilization "In the rich plains about Eleusis he reaped the first harvest of grain ever grown, and there, too, he built the earliest threshing floor. In a cart given him by

Demeter and drawn by winged dragons he flew from land to land scattering seed for the use of men..."
.
According to Diodorus Siculus (1st century BC) agriculture originated in this way: "Five gods were born to Jupiter and Juno, among them Osiris and Isis. Osiris married his sister Isis and did many things of service to the social life of man. Osiris was the first, they record, to make mankind give up cannibalism; for after Isis had discovered the fruit of both wheat and barley which grew wild all over the land along with other plants but was still unknown to man, and Osiris had also devised the cultivation of these fruits, all men were glad to change their food, both because of the pleasing nature of the newly-discovered grains and because it seemed to their advantage to refrain from their butchery of one another. As proof of the discovery of these fruits they offer the following ancient

custom which they still observe; even yet at harvest time the people make a dedication to the first

heads of the grain to be cut, and standing beside the sheaf beat themselves and call upon Isis, by this act rendering honor to the goddess for the fruits which she discovered, at the season when she first did this. Moreover, in some cities, during the festival of Isis as well, stalks of wheat and barley are carried among the other objects in the procession, as a memorial of what the goddess so ingeniously discovered at the beginning. Isis also established laws, they say, in accordance with which the people regularly dispense justice to one another and are led to refrain through fear of punishment from illegal violence and insolence; and it is for this reason also that the early Greeks gave Demeter the name Thesemophorus, that is lawgiver, acknowledging in this way that she had first established their laws".

Half a world away, we find a myth containing exactly the same elements: (i) people without agriculture are savages who live like animals and eat each other; (ii) through some divine instruction they not only learn how to produce food, but also to live by laws and to practice religion and those household arts common to civilized life. From the *Royal Commentaries of the Inca Garcilaso de la Vega* we read:

"Know then that, at one time, all the land you see about you was nothing but mountains and desolate cliffs. The people lived like wild beasts, with neither order nor religion, neither villages nor houses, neither fields nor clothing, for they had no knowledge of either wool or cotton. Brought together haphazardly in groups of 2 or 3, they lived in grottoes and caves and like wild game fed upon grass and roots, wild fruits, and even human flesh. They covered their nakedness with the bark and leaves of trees, or with the skins of animals. Seeing the condition they were in, our father the Sun was ashamed for them, and he decided to send one of his sons and one of his daughters from heaven to earth, in order that they might teach men to adore him and acknowledge him as their god; to obey his laws and precepts as every reasonable creature must do; to build houses and assemble together in villages; to till the soil, sow the seed, raise animals, and enjoy the fruits of their labors like human beings.The Inca king and queen arrived from heaven and were given a sign by which they would know where to establish a capital city. The place was located (Cuzco) and they set out to teach the savages how to live, how to clothe and feed themselves like men, instead of like animals".

The mythologies of the American Indians are enormously varied and complex, but here we shall only consider the themes of the Aztec and the Maya to compare with the Incan myth already cited. In the Aztec creation literature, Quetzalcoatl was described as "God of the air (or the sky), a divinity who, during his residence on earth, instructed the natives in the use of metals, in agriculture, and in the arts of government. Under him, the earth teemed with fruits and flowers, without the pains of culture. An ear of corn was as much as a single man could carry. The cotton, as it grew, took, of its own accord, the rich dyes of human art. The air was filled with intoxicating perfumes and the sweet melody of birds." In short, these were the halcyon days, which find a place in the mythic systems of so many nations in the world. It was the Golden Age.

Interestingly enough, both the Aztec and the Maya thought that maize was on earth before mortal men. In the Aztecan story, Quetzalcoatl disguised himself as a black ant, stole the cereal from Tonacatepel, and took it to Tamoanchin for the benefit of man. In the Mayan creation myth, the flesh of man was actually formed out of maize meal and snake's blood. It is little wonder that the maize plant is venerated to this day in Mexico and Guatemala. The Mayan epic also contains oblique references to a

garden of Eden or Golden Age in which nature yielded abundantly of its own accord: “In this manner they were filled with pleasure because they had discovered a lovely land full of delights, abundant in yellow ears and white ears (of maize) and also abundant in (2 kinds of) cacao and innumerable fruits of mammy, chirimoya, jocote, nance, white zopote, and honey. The foods of Paxily Cayalá were abundant and delicious”.

The basic theme is repeated with regularity around the world. From cuneiform tablets, we learn that the source of agriculture for the Babylonians, Chaldeans, and Phoenicians was a god named Oannes who appeared to the inhabitants of the Persian Gulf Coast and instructed them on growing crops and raising animals. “He also taught men to associate in cities, and to erect temples to the gods, he initiated them in the principles of legislation, and the elements of geometry. He showed them how to practice botany and husbandry; and he reformed and civilized the first rude and barbarous race of mortals.” Albright (30) refers to a Sumerian poem which describes the condition at the beginning, “when mankind had been created, but had not learnt the art of living. Men did not know how to make bread or bear, or clothing of woven stuff, but lived in the reed thicket. Then they were taught how to plant grain, to raise domestic animals, and to build houses of bricks”, etc.

“Moreover, in some cities, during the festival of Isis, stalks of wheat and barley are carried among the other objects in the procession, as a memorial of what the goddess so ingeniously discovered at the beginning.” (*Diodorus Sculls, 1st*

century BC, on the origins of agriculture

In Chinese mythology, P'an Ku separated the heavens and the earth, created the sun, moon, and stars, and produced the plants and animals. There followed 12 (or 13) celestial sovereigns, all brothers, who ruled 18,000 years each, then 11 terrestrial sovereigns, all brothers, who ruled 18,000 years each. After that came 9 human rulers, all brothers, who governed a total of 45,600 years. Among these was Shên-nung, who taught the people agriculture and developed medicine.” In another version, 16 rulers came after the 9 and these were then followed by the "Tree Sovereigns", one of whom was Shên-nung”. There are many variations of this particular theme, including the following description of Shên-nung by the ancient Chinese historian Se-me-Tsien. Shên-nung, he said, had the body of a man and the head of an ox, and his element was fire. He taught the people to use the hoe and the plow and initiated the sacrifice at the end of the year. He also found drug plants that cured and made a five-stringed lute. In later Chinese history, Shên-nung is considered to have been an emperor, and a fictitious date (usually about 2800 BC) was



assigned to his reign. He is said to have instituted the custom of ritually sowing 5 kinds of grains at the time of spring planting. The custom was preserved as late as the 20th century and the emperor himself participated in the ceremony. Actually, there is no evidence that there ever was a ruler by that name and the date is far earlier than any real date recorded in Chinese history.

There is no need to comment on all the various mythologies of agricultural peoples, but lest one be tempted to make too much of the similarities and underlying themes, one must point out that the Australian Aborigines, who did not practice agriculture, also had their mythologies and creation stories in which gods taught the people how to gather foods. One of the creation legend goes like this: “Ngalgulerg [a mythical woman] gave us women the digging stick and the basket we hang from our foreheads, and Gulubar Kangaroo gave men the spearthrower. But that Snake that we call Gagag taught us how to dig for food and how to eat it, good foods and bitter foods”.

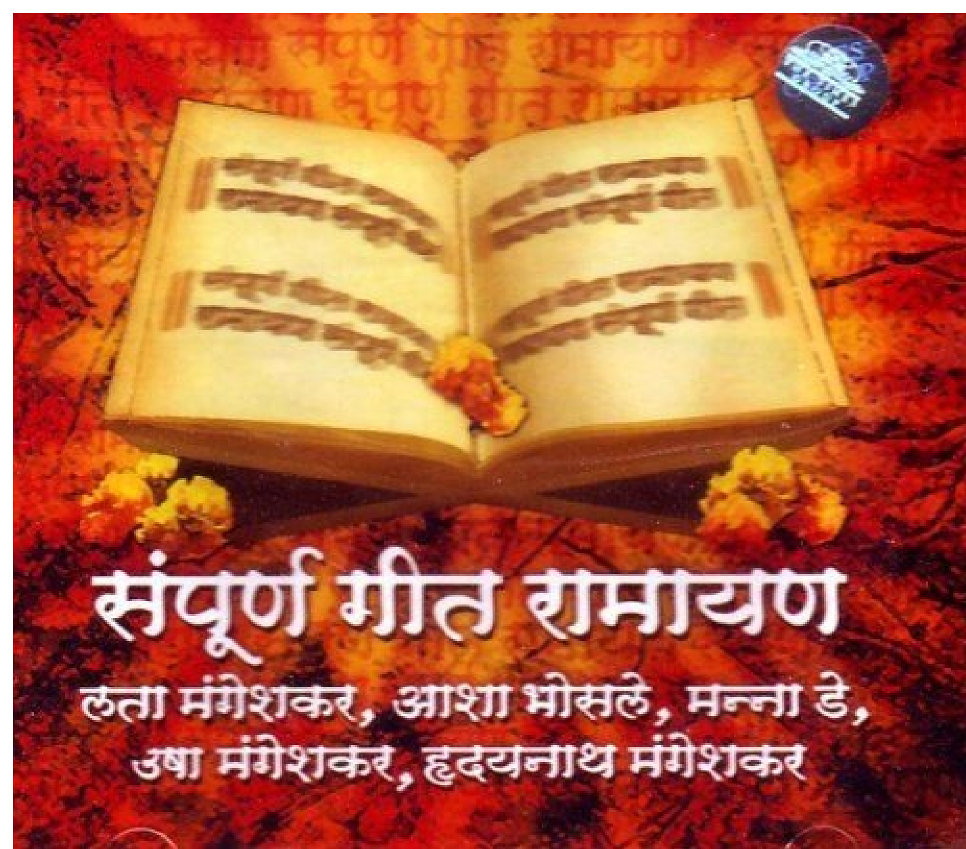
It is interesting to note that the non-farming peoples or times have uniformly been idealized in almost all surviving ancient texts. In many Sumerian, Babylonian, Indian, Roman, Judeo-Christian and Islamic texts there is an idea of a paradise or Golden Age when people did not have to work for food. This primitivism can be traced before the third millennium B.C. For many cultures and most periods, such Golden Age myths are a common form of history, in the sense of comparing them to now; a reference to ‘sacred’ or ‘blessed’ time. It is, therefore, perfectly possible to point to the existence of ‘non-farming’ people in the cosmologies of most agricultural societies, without assuming that they necessarily refer to actual hunter-gatherers.

In all the myths and tales mentioned so far, and many like them, the knowledge of agriculture is gratefully received as a blessing from gods. The outstanding exception are those found in Indian religious books, the Bible, and the Quran, where agriculture comes as a curse or a shear burden.

For example, Paddaya (31) notes a Jain text From India which describes how people were once ignorant of farming because prior to such and such reign there were *Kalpavrikshas* or wish-fullfilling trees which granted

people whatever they wished. Similarly a Sanskrit text of eleventh-century central India records how ‘in the period of the *Kritayuga* men were dwelling in groves, hills and forests, and near rivers and lakes, along with gods. The wishing-trees *Kalpavriksha* catered for all of needs. It was subsequently lost, so people were forced to make use of tree-foods. Later on they reaped the grain of wild rice’.

Warder (32) describes Buddhist texts in which early societies were morally perfect, and there was “no state or kingship, no sex or marriage, no property, no work, no caste, no war, no old age, or disease. The earth itself consisted of a delicious edible substance: at first no one touched it, but after a time it was tasted and found enjoyable, whereupon all took to eating it.... The edible substance disappeared but was replaced by edible fungi and eventually by edible plants.... Afterwards it was discovered that food could be stored. As soon as this was done there was a shortage of wild rice. The land was then divided into private holdings to ensure fair distribution, but as a result of this theft was invented”.



In the Indian epic Ramayana, agriculture is seen as a curse on mankind: "In the Golden Age, agriculture was abomination. In the Silver Age, impiety appeared in the form of agriculture. In the Golden Age, people lived on fruits and roots that were obtained without any

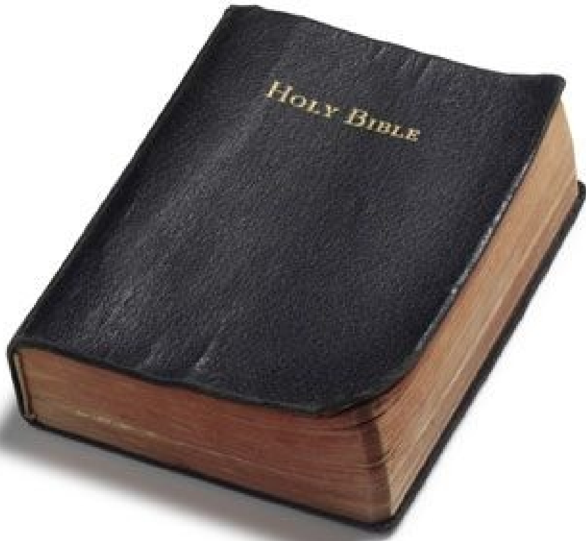
labor. For the existence of sin in the form of cultivation, the lifespan of people became shortened."

The Bible disparagingly describes agriculture as the penalty for the original sin. Humans were driven from the Garden of Eden where all their needs were being met because of that first moral transgression, and were ordained to toil the weedfilled land forever when God decreed: I have placed a curse on the ground. All your life you will struggle to scratch a living from it. It will grow thorns and thistles for you, though you will eat of its grains. All your life you will sweat to produce food, until your dying day. Then you will return to the ground from which you came. For you were made from dust, and to the dust you will return. To quote verbally:

3:17 “...cursed is the

ground for thy sake; in sorrow
shalt thou eat of it all the days
of thy life;

3:18 Thorns also and
thistles shall it bring forth to
thee; and thou shalt eat the



herb of the field; 3:19 In
the sweat of thy face shalt thou
eat bread, till thou return unto the
ground; for out of it was thou taken: for dust thou art, and unto dust shalt thou return.

Islamic traditions also show the same disdain for cultivation and agriculture. Allah freed the Children of Israel from Pharoah's bondage and ushered them to a forty years long march towards the Promised Land. On their way, they were supplied with plenty of natural food, the Manna and the Salwa, and no one went hungry:

"And I shaded them with clouds and I sent down to them the Manna and the Salwa. Eat out of what I provided for you", so says Allah in the Quran about the children of Israel on their wandering. The Manna is supposed to be a nutritious fruit that bore plentiful on wild bushes in the Sinai Desert, and the Salwa is believed to be a bird that congregated in numbers around the camps of migrating Children of Israel. But, these agriculturists-turned-huntergatherers were ungrateful people, they started demanding the products of the earth:

"O Moses, we cannot endure one and the



monished them:
same sort of food. Pray your Lord to bring for us the products of the earth such as green herbs, vegetables, cereals, garlic, onions, pulses and the like." they complained to Moses, to which Allah ad

"What! would you exchange that which is *meaner* for that which is *nobler*? Well, go and live in villages and you will get there what you demand." (33). Ultimately, Allah’s verdict was: “They were not unfair to Me (Allah) but unjust to themselves” (34).

Rice is an integral part of many cultures folklore. In Myanmar, the Kachins were sent forth from the center of the Earth with rice seeds and were directed to a country where life would be perfect and rice would grow well. In Bali, Lord Vishnu caused the Earth to give birth to rice and the God Indra taught people how to raise it. And in China rice is the gift of animals. Legend says that after a disastrous flooding all plants had been destroyed and no food was available. One day a dog ran through the fields to the people with rice seeds hanging from his tail. The people planted the seeds, rice grew and hunger disappeared.

The Basic Premises for the Development of Agriculture and Animal Husbandary: The development of agriculture and animal herding in the Old World obviously depended on the availability of domesticated plants and animals, either through the successful indigenous domestication or through ‘diffusion‘ of domesticated plants and animals from elsewhere. We are concerned here with the *origins* of agriculture which is clearly related to the indigenous domestication. The development of agriculture and pastoralism that is the outcome of diffusion from

elsewhere is the *spread* of agriculture and is the topic of the next Section.

Starting from the basics, we must ask what species served as the basis for early agricultural systems and where is it likely that hunter-gatherers regularly engaged in selecting such plants as food sources. Biogeography and biological systematics provide essential information about how species known today in domesticated form developed and through these the closest free-growing or freeranging relatives of crops and livestock can be identified. Comparisons between these provide a basis for identifying wild progenitors which may thus be identified archaeologically. Once identified, the ecology and geographical distribution of wild progenitors in the present day provides essential evidence from which to infer where these species would have been available to past human groups, and thus where they could have been first brought under human control. This information about modern distribution does, however, need to be considered in relation to past climate and environmental changes.

Some of these issues have already been discussed in the foregoing chapter of this Section. As has been said there, South-West Asia has been the most researched area of the Old World and most of our knowledge about the origins of agriculture derives from the discoveries in this area. Scholars studying the origins of agriculture have relied on analogies to illustrate and support their arguments concerning this fundamental archaeological problem. Although such analogies are sometimes implicit, they represent a common theme and an important arena in our discussions of the processes and events that led to domestication and the spread of agricultural economies.

Barley and wheat are the founder crops of agriculture in the Fertile Crescent and the sheep, goats, and cattle the primary domesticated animals. These crops and animals were also of importance to the agriculture of Iran, Afghanistan, Central Asia, and Pakistan. This subsistence base later became important to a substantial part of India as well. The areas in which these plants and animals were potentially domesticated have been inferred by combining their modern geography with information about paleoecology through the late Pleistocene and early Holocene. Their wild progenitors and ecologies have been adequately documented by various researchers but the equivalent level of information is not available for crops originating in other regions.

All these studies indicate that there were a number of plants and animals in the Levant and the transitional zone between the Mediterranean woodlands of oak and other trees, and the transition to grassland steppe, a zone that averages 400–600 mm of annual rainfall, that could be ‘domesticated’ and brought under human control, and that these domesticated plants and animals could then form a viable biological base for the development agriculture. A few of these eventually did emerge as the founder crops of agriculture in the Fertile Crescent, most of which were also of importance to the agriculture of Iran, Afghanistan, Central Asia and Pakistan.

Why some species of plants and animals were preferentially domesticated at the cost of the others is a question with which archaeologists and paleobiologist have been grappling for the past half a century, if not more. At the present the consensus seems to be emerging around a scenario which stipulates that the domesticated plants were in fact ‘weeds’ and they were “pre-adapted” for cultivation. With their weedy tendencies and their need for open rich soil conditions, they naturally colonized the bare ground and rubbish heaps provided by man. Since these plants had already evolved to have large food reserves, they were of particular interest to man.

We thus have the two attributes here: (1) "weediness", and (2) large food reserves which enabled them

to survive in very dry summer conditions in poor thin soil free from competition with perennial plants. According to Hawkins (36), these two factors together seem to be the key to the development of Old World mountain seed crops. To primitive man it must have seemed little short of miraculous to find that plants needed for food sprang up by his very huts and paths. Perhaps it is not too far-fetched to suggest that this situation might have been the basis for so many folk-legends which attributed the beginnings of agriculture and the introduction of useful plants to gods or supernatural beings.

The Process of Agricultural Development: Hawkins (42) suggests that seed agriculture developed in three stages:

Gathering and stage the pre-adapted weedy tendencies which were ecologically adjusted to growth in areas with well-marked wet and dry seasons and which possessed rather larger food reserves than normal began to colonize areas around dwelling places and were gathered from here and elsewhere by man, still at the food gathering stage. All evidence points to the fact that primitive peoples were extremely untidy, so that no doubt seeds were dropped by mistake round their dwellings after they had gathered them from afar. As the plants established themselves the collecting range was diminished and man's collecting and foraging began to be confined more and more to the vicinity of his dwellings where, in the richer nitrogenous soil, the weedy plants established themselves readily. Thus gathering changed imperceptibly into harvesting but as yet there was no planting. In this way a kind of symbiosis resulted from the ecological requirements of the plants on the one hand and the food needs of man on the other.

Harvesting: This is the second stage, where a build-up of mutations conduced towards more efficient harvesting by the selection of cereals with non-brittle rachis and in the selection of poor or defective capsule dehiscence in flax, peas, beans and other plants. Thus, unconscious selection by man of the plants with less efficient dispersal methods took place since it was the seeds of these that were automatically more efficiently gathered. Such plants would have been at a disadvantage in the wild, and indeed cereals such as maize lack all methods of natural dispersal and depend entirely on man.

Sowing (planting): As a third and final stage sowing as well as harvesting must have taken place. This is an active process which involves the careful retention of seeds and the concept of placing them in the more or less prepared soil of fields or gardens round the dwellings. Probably this came

Colonization: In the first wild plant species with very late when already a high level of social and cultural organization in the primitive "agriculturalists" had been attained. Prior to this stage one could visualize that although seeds from non-brittle cereals and non-dehiscent capsules might have been gathered for consumption only the wild type forms with brittle spikes or dehiscent capsules actually formed the basis of next year's crop, since the others were wholly eaten. At that stage, then, there must have been strong selection pressure *against* the non-brittle rachis. Not until some of the harvested seeds were kept for active sowing did the selection pressure change in favor of non-brittle spikes and only at that point could the crop be considered to be truly domesticated.

Animal Husbandry and Pastoralism: Animal husbandry involves the breeding, raising, and managing of domesticated animals by members of a human society. This can be carried out under many different conditions and does not presume any specific degree of economic specialization or of mobility or any particular way of life on the part of those who are engaged in the care of domesticated animals. The degree to which individuals or groups depend upon domestic animals and

animal products and the ways in which they husband their stock can vary from time to time, place to place, and circumstance to circumstance. Thus when we talk about animal husbandry, we do not mean to suggest anything about commitment to raising animals in relation to degree of commitment to other economic activities such as growing crops or trading or manufacturing. These activities can be undertaken in context with mixed farming (agriculture with animal husbandry) or as pastoralism, which is often distinguished from mixed farming although such a distinction is rare in todays' world. A pastoralist is one who derives most of his living from raising and herding animals.

Today's pastoralism in Central and South Asia may be a legacy of the past, representing a subsistence strategy in the face of environmental competition or socio-economic pressures from other human groups. According to this view, pastoralism was derived directly from hunting and gathering; hunters of wild goats and sheep already had knowledge of herd dynamics and the ecological needs of the herd animals; these groups were already mobile, and they routinely followed wild herds on their seasonal round. The process of domestication began before the first wild goat or sheep was tamed as a result of the selective pressure of hunter's prey-choice acting upon the herd. In this way, wild herds were selected to become more manageable for the proto-pastoralist nomadic hunter and gatherer groups. Thus, pastoralism has much more in common culturally with hunting and gathering styles of life than with sedentary agriculture. The necessity to move the herds continually in search of fresh pastures makes this a wandering, nomadic way of life. Human and livestock populations tended to wax and wane according to the vagaries of the weather - rainfall and availability of grass. While pastoral life is demanding and often dangerous, it is, as a way of life, relatively stable over long periods of time. What one generation knew and did, the next generation knew and did.

Opposing this view is a tendency among some scholars to see pastoralism as a way of living on the fringes of the agricultural zone, especially in those environments unsuitable for farming. This intellectual predisposition is probably based on a belief that hunter-gatherers have a generalized form of adaptation to this sort of activities and that this would have carried over into the early food producing era, with a balanced dry-farming/subsistencepastoralist adaptation, a view put forward by Susan Lessened Daniel Bates some years ago (125).



The geography of the domesticated sheep is controversial. It appears that it was domesticated at more than one locations and probably more than once

There is the evidence in Zagros area according to which sheep and goat herding is earlier than the development of agriculture. Evidence from India, especially in Gujarat and Rajasthan, also indicates the domestication of animals without the presence of seed agriculture or even a sedentary living.

According to the present-day opinions, pastoralism as a subsistence strategy followed mixed farming (crop cultivation and animal keeping). These models suggest that it was the introduction of irrigation to farming which resulted in the selective pressures for specialization. The increased productivity of agriculture ultimately resulted in population growth and pressure on resources, which lead to greater land and greater labor requirements for intensive farming. Marginal areas of land were often all that was left for animal rearing. To acquire enough forage, large distances had to be covered by herds. As a result, the two practices, i.e., seed agriculture and pastoralism, diverged and specialization took place. Seed agriculture and pastoralism thus developed alongside each other, with continuing interactions. Pastoralism tended to develop on marginal land apart from areas suitable for agriculture, often in semi-arid regions. Frequently, the two ways of life were compatible, or even mutually dependent. Wherever the two modes of life existed near one another, a lively trade usually sprang up between farmers who had grain, metal and fabricated objects to exchange, and pastoral nomads, who had hides, wool, meat, and milk products.

This is, however, not a case of dependency of one group on the other. The village and the pastoral

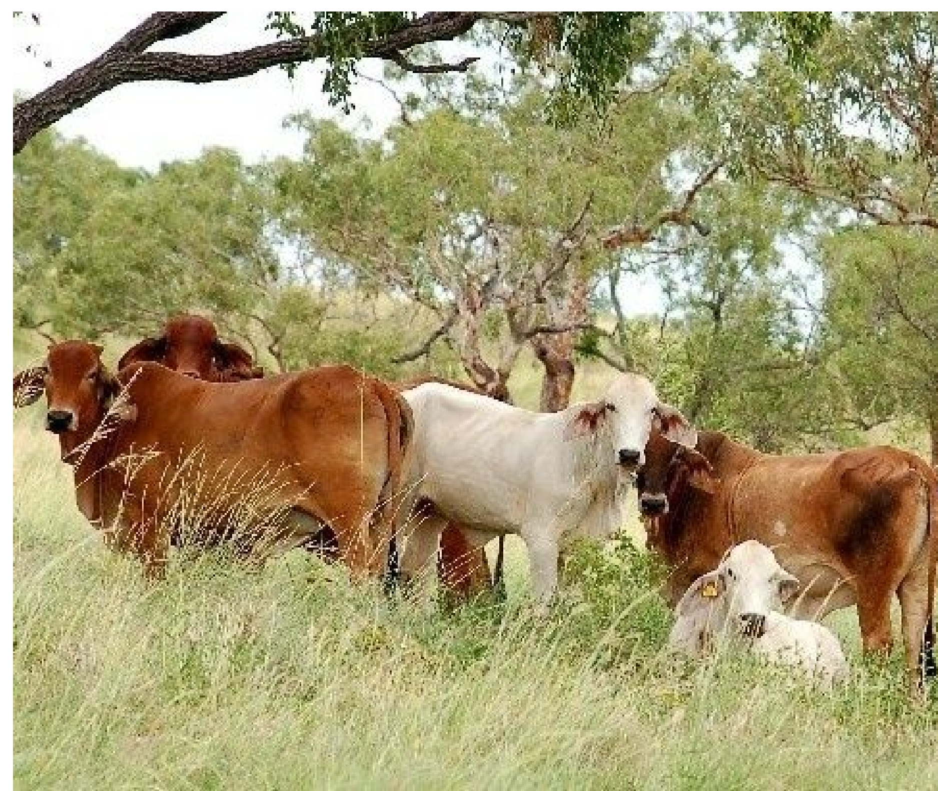
camp can be imagined to be on a multidimensional continuum. Village farming communities tend to rely on agriculture and plants, than on mobility and animals. The camp tends to rely on pasture and animals to be mobile and nomadic. But, both forms of settlement and subsistence utilize both domesticated plants and animals. Very few traditional farmers in settled villages keep no animals as a part of their subsistence strategy, especially in the Near East, Iran, Central Asia, and Pakistan. The same principle applies to the camp, or pastoral nomads, most of whom undertake some agriculture themselves, while at the same time relying to a great degree on their animals for their livelihood (126).

It is in these early contexts that we sense the beginnings of subsistence diversity that in later times yields the settled village farming community and the pastoral nomadic camp and many "intermediate" or variant forms, if one wants to think typologically. Many forms of adaptation using domesticated plants and/or animals are present by the earliest historical periods of the Near East and probably appear a good deal earlier in time (126).



There are several species and subspecies of goats in Eurasia and they most likely originated in Baluchistan, central Asia, and the Near East. Each region carries several varieties of the domesticate.

Beyond animal herding for meat are important secondary developments in animal management. Consideration should be given to the complex of secondary products, especially milk, wool and traction. Sone unquestioned assumptions about secondary products have entered the discussion of early agricultural production in Pakistan and elsewhere. For example, it is often assumed that the presence of domestic cattle was due to the use of milk as an important resource of food but no evidence has been offered to that effect. It is known that cattle or other domesticates are not universally milked, and there remain groups in India, for example, today who abstain completely from such activities. Thus dairying is a product of particular cultural historical trajectories and not a universal development. Judging from some ethnographic observations in Baluchistan and the Pashtun country, if dairying was of some substance in subsistence regime of the early Neolithic settlers, it is more likely to be goat and sheep-based rather than cattle- based. The data from Miri Qalat (a Harappan age site in Baluchistan) are suggestive to the manage



The cattle was most likely domesticated at more than one location - Baluchistan, the Near East, and north Africa bering the primary suspects.

ment of sheep and goat for secondary products (43). Plausible sequences for the emergence of such forms of pastoral management, as inferred from a change in age profiles, have been reported from the Bannu basin of northwest Pakistan from the pre-Harappan Kot Diji phase (44). In general, however, such data have been rarely reported from Pakistan's archaeozoological assemblages.

The use of animals as sources of traction, and the contribution of this to crop production, also requires systematic consideration. In the case of Pakistan, clear evidence for use of cattle for traction is available from the third millennium BC based on study of bone pathologies as well as model ploughs (7). The spread of plough agriculture in peninsular India remains problematic, although it is sometimes suggested to be coincidental with the adoption of agriculture in the second millennium B.C. In many parts of the Deccan, ploughing seems to have been adopted only in recent centuries (45). Of interest in this regard is historical linguistic analysis for widespread cognate terms for plough in Indo-Aryan, Dravidian and Munda languages which may derive from early borrowing between these groups or from a common substrate, most likely from the Inus Valley (46,47).

There are some animals, such as camel and horse, which were domesticated in Central Asia quite early on but one does not find their trace in ancient Pakistan till very late in the early history of the region. The rock paintings in Chilas area do depict domesticated horse and dog, along with goat and sheep, but their exact chronological settings have not yet been determined.

Spread of Agriculture: From the difficulties encountered in trying to determine areas of origin, we now turn to the topic of the spread of agriculture. This invites a few introductory comments, pending the full discussion in Section V. where we concentrate the spread of agriculture in Pakistan in context with the region of the Fertile Crescent, Central Asia, and India.

From the homelands of domestication, wherever they happened to be, food production spread around

the world in either of two ways. The first was for hunter–gatherers to acquire crops or livestock from the food-producing areas, enabling them to settle down as farmers or herders, as attested by archaeological evidence for substantial continuity of material culture, and by genetic, linguistic and skeletal evidence of continuity of human populations. The clearest such example of local adoption of food production is in southern Africa, where around 2,000 years ago some Khoisan hunter–gatherers acquired Eurasian livestock (cattle, sheep and goats) arriving from the north and became herders (so-called Hottentots). This mechanism is what archaeologists call “cultural Diffusion”. The second mechanism has been named ‘Demic Diffusion”. Here the local hunter–gatherers had no opportunity to acquire crops and livestock before they were overrun by farmers expanding out of the foodproducing areas, exploiting their demographic, and technological advantages over the hunter–gatherers.

Expansions of crops, livestock, and even people and technologies tended to occur more rapidly along east–west axes than along north–south axes (103). The reason is obvious: locations at the same latitude share identical day-lengths and seasonalities, often share similar climates, habitats and diseases, and hence require less evolutionary change or adaptation of domesticates, technologies and cultures than do locations at different latitudes. Examples include the rapid westwards and eastwards dispersal of wheat, horses, wheels and writing of western Asian origin, and the westwards dispersal of chickens, citrus and peaches of Chinese origin, along the east–west axis of Eurasia. This can be contrasted with the slow spread of Eurasian livestock and non-spread of Eurasian crops southwards along Africa's north–south axis, the slow spread of Mexican corn and the non-spread of Mexican writing and wheels and Andean llamas and potatoes along the Americas' north–south axis, and the slow ers at the same latitude within Asia and North America, but the general pattern remains. One such barrier was the extensive desert, the Thar, that for a long time prevented the spread of agriculture from the Indus Valley to Central India.

In the 1960s and 1970s there was a strong tendency to reject earlier "crude" diffusionist expla

The Mesolithic nations of cultural change and to posit multiple in

dependent innovations - in domestication and agriculture as in other aspects of past human behavior. This tendency was evident, for example, in reevaluations of prevailing assumptions about the spread of agriculture from Southwest Asia to Europe. More recently a greater readiness to emphasize again the role of diffusion has become apparent. However, this shift is not just a swing in the pendulum of academic fashion. It stems from a

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more subtle appreciation by anthropologists, archaeologists, geographers and other social scientists of the complexity of the processes by which cultural innovations spread and are adopted. In the study of early agriculture this tendency has shown itself particularly in the continuing debate between

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those who see the beginnings of agriculture in

Europe as a result of the "demic diffusion" of migrant neolithic farmers and pastoralists from Southhave argued that domestication took place because the west Asia and those who prefer to emphasize the

groups out of the optimum

hunters-gatherers but also the incipient agriculturists and pastoralists. It is presumed, and there is strong evidence for it, that all those modes of subsistence

spread of food production southwards along the processes in interpretations of the dispersal of agri

coexisted with each other. It is also logical to presume that the composition of

similarly slow dispersal of agriculture from the South The role of demic diffusion in spreading agri

this continuum differed from region to region.

culture and pastoralism is given greater emphasis, on a grander scale, by Cavalli-Sforza and by Renfrew in their contributions, which link the distributions of particular human genes and of languages to the spread of agriculture in, and even beyond, Eurasia. Bellwood, too, gives great weight to demic diffusion and also links the spread of agriculture with the spread of language. A similar effort is sometimes made on genetic basis for explaining the spread of agriculture from the Fertile Crescent to the Indus Valley.

The relative importance of independent ori

gins and subsequent diffusion remains, of course, a considerationsattempting to answer it, we need carefully to evalucardinal question in the study of early agriculture. InTheoretical

ate all the evidence available in par ticular regional and continental con texts, and in so doing to identify significant gaps in our know ledge that need to be filled by future re search. The rise of civilization in the Indus Valley is case in point. Here the indications for a demic diffusion

notwithstanding, a sophisticated hunting and gathering, directly antecedent to the appearance of settled farming communities, has not yet been defined well in Pakistan. Almost nothing is known of



between the end of the last glacial age

In the early Holocene, wild barley

c.

grew over a large area, ranging

12,000 BC

from the Mediterranean to the
is

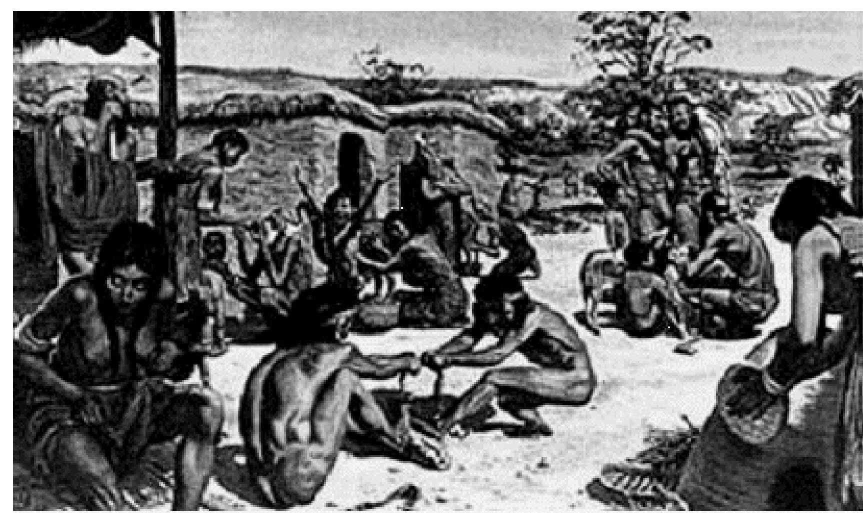
beginnings of Mehrgarh c. 7,000 BC. At the earliest period of this site and that

southwest Asia,

of Kili Gul Muhammad in the Quetta valley, these people were already farmers

tropical Andes, eastern North America and sub

and lived in permanent settlements. At least, that is the belief in archaeological



(from the Middle East and Central Asia) is tenuous, to say the least.

Thereis general agreement
to

archaeological and paleobotanical investigations, and new discoveries, especially in China, mean that

circles. Nevertheless, a transitional stage must have interposed during which

relationship requires constant reappraisal. Until re

some hunters-gatherers graduated to pastoralism and agriculture. Such a stage,

The story of the domestication of wheat is complex. However, its origin has been genetically
west Asia, notably for the domestication of wheat and barley *ca*. 10,000 years ago but new evidence

traced to south-eastern Turkey. although not directly visible at Mehrgarh or anywhere else in Pakistan, is

(of rice) to *ca*. 11,000 years ago (93).

evidenced through an examination of the typology of stone tools that man

domesticates and other cultural items by the indige was domesticated, along with barley, *ca*. 10,000

fashioned and used. Thus, we do not have any choice but to define and describeyears ago in southwest Asia. It is thought that mod

difference can be characterized as one between
primary ("demic") and secondary ("cultural") diffu
ern bread wheat originated as a hybrid between emmer wheat and another *Triticum* species (*T.*

this period, just like we defined and described the Paleolithic period in the

tauschii). From its area of emergence in the region south east of the Caspian Sea, bread wheat along

previous chapter, on the basis of the typology of tools and the technology to make them. On this basis, we call this period the *Mesilothic:*
between the Upper Paleolithic and the Neolithic, the latter of which is, in effect,

with emmer wheat were introduced into Europe and Asia. Recent work on the genetic constitution of numerous wild einkorn lines in the region between southeast Turkey and western Iran has also helped to establish where domestication of this species occurred. Heun *et al*. (97) examined DNA from 68 lines of cultivated einkorn and 261 wild einkorn lines from this region and nearby. Their results show

that the most distinct lines genetically come from the Karacadag Mountains, southeast Turkey. Moreover, these lines were also the closest genetically to the cultivated lines, implying that the wild lines comprised the ancestors of cultivated einkorn. This possibility is also supported by the fact that archaeological sites in the region contain remains of both wild and cultivated einkorn. These sites include Cafer Höyük, Cayönü and Nevali Cori which are some of the earliest agricultural southwest Asia.

Barley, lentil and olive were other early domesticates in this centre from whence they influenced the development of agriculture in Europe and Asia as did flax which was selected for its fibre. The adoption of domesticated species, along with the continued use of wild cereals and pulses, was widespread by *ca*. 9,000 years ago as is evidenced by remains of wild and domesticated plants at several archaeological sites in the valley of the middle Euphrates. As with rice and other crops, there is considerable debate about the possibility of multiple domestications of individual crops as compared with single domestications, i.e., polyphyletic evolution and monophyletic evolution. In relation to the crop assemblages that originated in southwest Asia, genetic data indicate that monophyletic evolution is most likely.

The most important crop in terms of modern world agriculture to emanate from the sub-Saharan center is sorghum. According to Harlan (98,99), the earliest evidence for this is a grain impression on pottery approximately four thousand years old. Many other crops were domesticated in this center, including African rice, various millets, various oil crops, yam, coffee and old-world cotton. Although this center produced a wide range of crops, little is known about the spatial and temporal patterns of plant domestication. Harlan has suggested that agricultural systems were emerging by *ca*. 7,000 years ago and that by 5,000 years ago pastoralism based on cattle was widespread, with sorghum cultivation beginning *ca*. 4,000 years ago and pearl millet later at *ca*. 3,000 years ago.

The case of domestication of animals is just as murky. One question, which has been debated settlements in

endlessly in recent years is whether pastoral societies, the human groups who are engaged in animal husbandry but otherwise are foragers, can exist without the benefits of agriculture. A large number of scholars subscribe to a necessary linkage between pastoralism and agriculture. This insistence on the existing of agriculture for the emergence and sustenance of pastoralism draws heavily on the model of Australian or Kalahari Desert groups, or Arctic hunters, living in environments too hostile for agriculture but on the fringes of the areas where agriculture does exist. Recent research, however, indicates that pastoralism could have existed, and did exist, in the absence of agriculture. This is evident in the case of parts of Africa where in the early to midHolocene Sahara cattle herding may have begun before 7000 BC, at a time when no domesticated plants are known from the region (9). Most of the



Herding of goats and sheep is an important segment of subsistence strategy on the mountain slopes of Baluchistan and the Pashtun country in the present-day Pakistan

sites across the Sahara with archaeobotanical evidence indicate grass-seed foraging and limited herding of cattle together with hunting, with evidence of plant domesticates and more sedentary sites only from the third or early second millennium BC. In the high Andes of Peru, available evidence suggest that hunter-gatherers gradually brought camelids (llama/alpaca) under control through an *in situ* domestication process in the mid Holocene, but they utilized entirely wild plants. Subsequently sedentism emerged and camelid herds were integrated into economies of cultivators at lower elevations. Although patchy, and limited by methodological problems of identification, the evidence from India suggests that pastoralism spread amongst hunterforagers of the semi-arid scrub/savannah zones during the mid-Holocene prior to the emergence of agriculture.

Investigating where pastoralism began and where it then spread largely relies on archaeological evidence either of the process of domestication or the local introduction of domesticates. Animal and plant domestication represent qualitatively different phenomena although they share a number of features. While domesticated animals differ from their wild progenitors morphologically, genetically and behaviorally today, this could not have been the case throughout prehistory since it represents the result of genetic selection under human influence. The beginnings of herding cannot be simplistically sought by finding the earliest “domestic” bone remains but the presence of clearly morphological domesticates provides a minimum age for the processes of management that lead to those changes.



Some of the pastoral groups in Iran, Afghanistan, Central Asia, Pakistan, and India are still nomadic.In Pakistan and Afghanistan, the herding of goats and sheep is more common but in India the nomadic pastoralists seem to prefer the cattle.

Relatively few animal species have been domesticated when compared with the range of plant species, though together domesticated plant and animal species represent a tiny fraction of the earth’s biodiversity. Moreover, several of the centers of plant domestication were centers of animal

domestication, notably southwest Asia and the tropical Andes, as shown in Figure 2. in several places.

Southwest Asia is still considered a major center of domestication. According to Davis (100), the domestication of all these animals occurred between 10,000 and 7,000 years ago. The ancestors of the domesticated sheep, goat, cattle and pig are thought to be the mouflon, bezoar goat, auroch and wild pig respectively. In the case of domesticated cattle, there is biomolecular evidence based on the analysis of the mDNA sequences in the modern species in Africa, Europe and Pakistan that indicates that there were at least two centers of domestication (101). One of these was probably southwest Asia whilst the other was in Pakistan.

The wild ancestors of these animals were all hunted prior to domestication all over the Middle Asia, including the Levant and Baluchistan, along with other species such as the mountain gazelle, though the latter was never domesticated. Even after the domestication of cattle, sheep, etc., wild animals remained an important supplementary source of protein. According to West and Zhou (102), the chicken is the earliest domesticated bird; this originated in southeast Asia from the red jungle fowl, for which there is genetic evidence. From here it was introduced to China and Europe *ca*. 4000 years ago. Another animal domesticated in Asia is the water buffalo. Mitochondrial DNA analysis indicates that there were at least two separate centers of domestication. One such centre may have been the Yangtze River delta where the oldest remains of water buffalo in China have been found and which are dated to *ca*. 6,000 years ago. The other center could be on the border of Sindh and Baluchistan.

In Pakistan we do not know when domestication of plants and animals took place and when foragers turned to become agriculturists but we do know where. Our earliest evidence for domesticated plants and animals come from Mehrgarh. This evidence clearly shows that wheat, barley and some pulses were domesticated there before 7000 BC or acquired from the West in domesticated form prior to this date. Domestication of sheep, goat, and possibly cattle was most likely undertaken during the same time period from where they were transmitted to the West. We shall discuss this topic in some details in Section V.

Agriculture and animal domestication is one end of a gradient of human interaction with plants and animals. Ethnographic studies have shown that procurement of food by hunter-gatherers often involves different degrees of manipulation of organisms and their environments. These may range from almost incidental effects such as the dispersal of seed during harvesting to large-scale environmental manipulation by burning vegetation to increase yields of game or seeds, recorded ethnographically in Australia, Africa, and the Americas. Small-scale cultivation of wild plants is also known.

Identifyingearlydomesticatesandlinking them to particular geographical areas is still a major challenge for archaeologists. There are two main reasons for this: first, that early archaeological sites and the evidence they contain are usually less well preserved and difficult to date; second, that there are relatively few excavated sites over what are usually long periods of prehistory. There is evidence from a number of areas, such as late Jomon, Japan, that agriculture can initially form a relatively minor part of food procurement systems, and key variables associated with agriculture, such as population increase, only comes into play once agriculture has been more fully adopted. The same situation seems to exist in Baluchistan as well. In contrast, agriculture in the Near East seems to have spread fast, as an identifiable Neolithic “package.” There is the question whether the evidence from South-West Asia, the area that has been very extensively researched as opposed to other regions

where research has been only spotty, truly represents the actual situation. It is very well possible that this lop-sided research has served its own selffulfilling prophecy, designating region of South-West Asia as the Hearth of Domestication. Clearly generalizations about the impact of agriculture on huntergatherer societies may be hard to sustain on a cross-cultural basis.

Some Consequences of Agriculture: It is widely agreed that the importance of the food production and domestication revolution lies in the profound consequences that it brought to human life. A series of changes and implicationscan be outlined that focus on three interdependent phenomenoa (Indus Age): sedentism, changes in human social organization, and alteration in human demographic pattern**.**

The most fundamental and far-reaching consequences of the 'agricultural revolution' in the early Holocene was that it enabled more food to be obtained and more people supported per unit area of the exploited land. It thus facilitated long term sedentary settlement and maintenance of large and more complex social groups, which in turn enabled urban society to develop.

The advent of food production and domestication is not the first time that people settled into fixed sites of abode but it does seem to mark a period when this settling-in was accompanied by an elaborate investment in facilities, and an emphasis on the definition of productive land, house plot and village site ownership. The degree of emphassis on land and investment in land and other facilities, is new and fundamentally important change in human society. Much of this seems to be tied to the necessity of investment in the preparation and improvement of cultivation plots and in houses and associated facilities such as storage for food stuffs, especially grain (Indus Age).

With sedentism comes a growth in the interconnections between communities that seem to reflect a growth in what anthropologists call 'exchange systems'. The exact nature of these systems, and why they came to grow with the advent of village life is not wholly understood. We suspect that there were some useful, new social arrangements in differing environments that interacted to bound the various individual and groups together.

In many early agricultural areas, a key incentive to stability was the need for irrigation systems. Irrigated agriculture depended on arrangements that would allow farmers to cooperate in building and maintaining irrigation ditches and sluices. Some rivers encouraged elaborate irrigation projects that could channel water in virtually assured quantities to vast stretches of land. Since large irrigation projects were beyond the means of the early settlers, The settlements were generally along the banks of small rivers, lakes, and perennial water streams. Although the irrigation project must have been modest, some regulations and conventions were still needed to regulate the uses of the water resources. This implied an increase in the scale of political and economic organization. On this assumption, a close link between irrigation and the emergence of civilization has been theorized.

The revolution brought by food production and domestication is best thought of in terms of its impact on the way in which people organized themselves, and how this in turn led to further changes. The nature of these changes and how these changes were triggered by food production is a vast subject and a lot has beeb written on it. It is still an area of ongoing research and of deep scholarly interest.

The settled village and pastoral communities that seem to be part of the early history of food production and domestication called for new means of social control and overall assessment of gests that the flexible bilateral kinship systems of hunter and gatherers seem to have given way to more rigidly defined lineage systems, with property rights closely tied to group membership.

Craft and career specialization also originates within the historical context of early agriculture and herding. We see a progressive growth in numbers of craftsmen and community leadrs, which have paralleled growth in the size of communities. The increasing sophistication in the suite of artifacts that emerges is impressive at times and seems to indicate a growing knowledge of natural processes and primitive science. The availability of storable food, such as grain and dried fruit, and the development of storage facilities made it possible to redistribute food surplus to feed full-time craftspeople and inventors. Also, feeding full-time kings, bureaucrats, nobles and soldiers, these food surpluses led to social stratification, political centralization and standing armies.

Food production was accompanied by a human population explosion that has continued unabated to this day, resulting from two separate factors. First, the sedentary lifestyle permitted shorter birth intervals. Nomadic hunter–gatherers had previously spaced out birth intervals at four years or more, because a mother shifting camp can carry only one infant or slow toddler. Second, plant and animal species that are edible to humans can be cultivated in much higher density in our gardens, orchards and pastures than in wild habitats.

Not only did the population grow but there must have a significant redistribution of people. Agriculture and pasture land is not necessarily the best for hunting and gathering and people would have gravitated away from the latter into the former. Swamps were drained, light savannah grasslands plowed and some of this brought people into environments that might have been downright dangerous.

There also developed certain religious beliefs and practices as is evident from the planned burials belonging to the early Neolithic period period. The presence of beads and ornaments of seacommunity leadership. An

ethnographic record sugshell and lapis lazuli and other semi-precious stones at certain sites, fore example at Mehrgarh, suggest that these products or the raw materials for them were brought from their resource areas faraway in distance. It indicates the existence of some sort of rudimentary exchange system. In other words, Neolithic period was marked by qualitative changes not only in tool-making techniques but also in the socio-economic spheres of humankind.

Apart from the consequences that are generally considered positive for human progress, there were some consequences which are definitely negative. One such a consequence is the spread of infectious diseases among animals as well as in humans. The main killers of humans since the advent of agriculture have been acute, highly infectious, epidemic diseases that are confined to humans and that either kill the victim quickly or, if the victim recovers, immunize him/her for life. Such diseases could not have existed before the origins of agriculture, because they can sustain themselves only in large dense populations that did not exist before agriculture, hence they are often termed 'crowd diseases'. The mystery of the origins of many of these diseases has been solved by molecular biological studies of recent decades, demonstrating that they evolved from similar epidemic diseases of our herd domestic animals with which we began to come into close contact 10,000 years ago. Thus, the evolution of these diseases depended on two separate roles of domestication: in creating much denser human populations, and in permitting much more frequent transmission of animal diseases from our domesticates than from hunted wild animals. For instance, measles and tuberculosis arose from diseases of cattle, influenza from a disease of pigs and ducks (6).

Concluding Remarks: As is evident from the above discussion, the origins and spread of agriculture

in Eurasia is rife with controversies. However, there are a few points on which there is a general consensus (48):

1) Plants were important in human subsistence prior to the transition to agriculture. The shift to dependence on the cultivation of fully domesticated plants was a very gradual process. There was a long period of availability of either wild ancestors or the cultigens themselves, as well as of domesticated plants and animals, prior to the full adoption of agriculture in the area where agriculture eventually took hold as a subsistence regime (49).

2) Evidence from the Near East and many other areas suggests substantial interaction between foragers and farmers *before* agriculture was adopted by the hunter-gatherers. Domesticates initially were a supplement to existing foodstuffs in a broad-spectrum diet and considerable time passed before intensive food production began. In the Near East, for example, there was substantial delay in the spread of some domesticates between 8000 and 6000 B.C. The recent and present-day ethnographic record of foragers and farmers is characterized by a spectrum of activities, with hunting and gathering at one end and intensive farming at the other, rather than by a clear-cut division between foragers and farmers. There is a similar spectrum between highly mobile and sedentary societies, and between very low-density and high-density population levels. These spectra broadly match, with highly mobile low-density foragers at one end and sedentary/high-density farmers at the other. Furthermore, there are many examples in the historical period of people shifting their location on the foraging-farming spectrum in response to changing opportunities or threats

3) Domesticated plants and animals appear to spread through diffusion rather than through colonization by new peoples. With only a few exceptions, the general pattern for the transition to agriculture is one in which local peoples adopt the ideas and products of cultivation and herding. The last hunters *were* the first farmers. Exceptions to this rule occur primarily in areas with small indigenous populations.

4) Sedentism is regarded as a prerequisite for the advent of agricultural societies. It existed in many areas where farming originated and spread. The exceptions to this pattern in Mesoamerica and South America are controversial; new radiocarbon determinations suggest that early domestication and sedentism indeed appeared close together in time.

5) A change from community to household levels of economic organization may have accompanied the transition to agriculture, including a shift from communal sharing to familial or individual accumulation. Economic intensification and competition were frequent companions of the Neolithic revolution. Wealth accumulation and status differentiation appear at the individual, household, and lineage levels. The transition to agriculture may well be closely related to the beginnings of hereditary inequality in human society

6) In terms of where the domestication of plants and animals occurred and where agriculture took hold as the main source of food, some of the earliest evidence for the domestication of plants and the beginning of agriculture comes from southwestern Asia (the Near East). A variety of food plants, including wheat, rye, barley, lentils, chickpeas and peas were domesticated there in about 11,000 to 9000 years ago, which then became the foundation of an agricultural economy ca. 9,000-7,000 years ago. This view, held for a long time, is now changing. Although numerous important domestic species come from the Near East, many other peoples around the world also domesticated wild plants and animals. For example, corn domestication occurred in Central America and spread to South

America. Likewise, domesticated Asian rice is from India and China, domesticated zebu cattle and probably also the goat from Baluchistan, and several species of millet from East Africa (43). The advent of techniques to ascertain the genetic characteristics of plants and animals is generating a new body of evidence to identify the wild ancestors of domesticated species and thus to identify centers of domestication. Similar techniques are also available to examine the genetic relationships between human groups, and data so generated are being used to identify the movement of people in relation to the spread of agriculture.

Domesticated plant species that formed the basis of agriculture include several large-seeded grasses, namely wheat, barley, millets, sorghum, rice, and maize; tuberous root crops such as manioc, yam, and potato; and pulses such as beans, peas, and lentils. These constitute the staples that have proved an excellent source of carbohydrate, and are grown in many parts of the world today. Successful farming economies, however, needed to combine these carbohydrate-yielding staples with sources of protein from animal products. Only certain species of animals were capable of successful domestication and of being combined into a farming economy. These include a few large terrestrial herbivores, notably sheep, goat, cattle, horse, camel, water buffalo, and llama, and a few smaller herbovore and bird species, including chicken, turkey, rabbit, and guinea pig. These animals represent only a tiny percentage of the total available species, and it has been argued that of the 148 available large terrestrial herbivorous mammals, only 14 have been successfully domesticated (6). Others do not breed readily in captivity or are very difficult to herd and manage. The combination of plant and animal species varied significantly from region to region, largely in response to the range of locally available domesticable species. It is significant, for example, that whereas all Old World agricultural economies relied on a combination of plants and animals, in much of the New World no suitable large herbivores were available for domestication. In Central and North America, early agriculture was based on the "Three Sisters" - maize, beans, and squash - which together provided the sources of carbohydrate and protein essential for a successful agricultural economy.

The chronology of the development of agriculture in different parts of the world is still uncertain and controversial. The belief so far has been that seed agriculture began in the Near East *ca.* 9,000 BC, followed by animal herding a couple of thousand years later. The beginning of agriculture and animal herding in Europe to the west and in Baluchistan and Turkmenia was assigned dates a few thousand years later. However, new developments in radiocarbon age determination have begun to alter this conventional wisdom about when the earliest domestications occurred and agriculture began. The real answer to the question 'how far back does farming go?' , however, depends of course on what particular activity or activities along a long and complicated spectrum of potential behaviors we choose to define as the beginnings of farming (or agriculture, herding, horticulture, and husbandry).

In terms of modern biological definitions of domestication, the key threshold is when the plant or animal cannot survive and produce offspring in the wild, but as the archaeological record considered in this book makes clear, focusing on this alone would take out of consideration a huge range of novel relationships between humans, animals, and plants that have to be understood within any holistic model of forager-farmer transitions. In many evolutionary models of plant cultivation, the decision to prepare ground and plant crops, as well as to tend and harvest the latter, is seen as a defining moment, though there are examples of foragers doing both (Australian Aborigines with wild yams, for example). In the case of animals, Zeder proposes that the critical threshold was not so much when managed herds were isolated genetically from wild populations, but when humans started to

intervene deliberately and systematically in the life cycle of target species, manipulating herd structures in order to promote herd propagation.

Burning the landscape to enhance food supplies is certainly as old as the first modern humans who reached South-East Asia (at least) 45,000 years ago, and possibly as old as 100,000 years in Africa on the evidence of Klasies River Mouth, though all the other indicators of modern human behavior are not observed in the African archaeological record until about 55,000 years ago. It would appear that, pretty much from the outset, modern humans were thinking about their environment and their place within it, and putting their mark on the landscape, in very different ways from earlier species such as *Homo erectus* and Neanderthals. Even on a minimalist interpretation of the evidence for 'landscape intervention', 'domestication was accompanied by a prior empirical environmental consciousness'.

Recent studies have suggested that the key to the beginning of agriculture may in fact lie in environmental change, although not the sort suggested many years ago by Childe. The extinction of big game, which took place in Europe, was not really a factor in zones of early agriculture such as West Asia. Here, gazelles, wild cattle, onagers, deer, and wild goats remained the main sources of meat during much of the Pleistocene as well as in the early Holocene. On the other hand, what does seem to be relevant is the fact that in many parts of the world, the Holocene was marked by the onset of a milder, warmer, wetter climate. Such changes may have led to an expansion of the natural habitat area of wild cereals that had the potential for domestication. Perhaps it was not an environmental crisis but amelioration that was responsible for the beginnings of domestication.

Given the limitations of the evidence and the fact that we are looking at very slow, gradual processes that must have varied in pace and detail, we may never be able to fully comprehend the details of the processes of animal and plant domestication or identify the impulses that lay behind them. It should also be remembered that in the case of complex cultural processes, the archaeological evidence often provides little 'hard data' on social and political factors that may have had an important role to play. More important than isolating a single factor responsible for the origins of domestication is to try to track down the process as it unfolded in different regions. Given the variety in ecology and resources in the various centers of early plant and animal domestication, it is quite possible that different factors may have been involved in different parts of the world.

As far as the beginning of agriculture in South Asia is concerned, the current orthodoxy has been that Indo-European PPNB farmers migrated eastwards from the Zagros across the Iranian plateau to Turkmenistan, Dravidian rice westwards to the Ganga (Ganges) valley. This kind of model was first proposed, like the Neolithic colonization of Europe, at a time when the archaeological evidence for early farmers was thin on the ground and that of the 'recipient forager population' hardly existed at all. The data base is still exiguous, but certainly no longer fits theories of agricultural beginning in Central and the Indus Valley as a result of Indo-European and Dravidian migrations.

As mentioned earlier, there is no *a priori* reason why cereal and sheep/goat husbandry is not at least as old in this part of the distribution zone of the wild progenitors as in the better-researched parts of the hilly flanks of the Fertile Crescent. The distinctive nature of the kind of mixed farming that developed contemporary with PPNB farming to the west (which included durum wheat, date, and cotton), together with DNA studies of modern cereals and livestock, imply that this may well have been the case (7). In the Ganga valley, foragers were harvesting wild rice very early in the Holocene, and by the time farming villages had developed to the west like Jeitun and Mehrgahr, the rich food

resources of the Ganga valley had been sustaining complex foraging societies for long.

Another finding of general wider models of foraging-farming Pakistan is the evidence from Mehrgarh for the movements of resources over huge distances, linking very different kinds of farming and foraging societies. Whatever the intermediaries, Indus valley farmers may have acquired some of their millets and pulses through trade variously with Oman (1,250 kilometres away), Mesopotamia (2,500 kilometres), East Africa (3,000 kilometres), and central/ southern India (1,000 kilometres), and rice from the forager-farmers of the Ganga valley (1,000 kilometres) (7), in addition to domesticating their own plants (such as barley) and animals (such as zebu cattle and water buffalos) indigenously. Similarly, the hugely improved database of well-dated sites with well-studied subsistence data makes it quite clear that the beginnings of millet farming systems in central and southern India were characterized not Afghanistan, farmers from and Pakistan, and East Asia migrated

significance to transitions in by the steady 'wave of advance' predicted by colonist migration models but rather by 'punctuated explosive dispersal'. Barker has argued (7) that the dominant process was the acquisition of domesticates by indigenous foragers, at different rates and in different ways.

To return to the comments made at the beginning of this section, there was no inexorable path to agriculture, no unstoppable progress along an evolutionary spectrum from low-input mobile foraging to intensive sedentary farming. Hunting-andhorticulture and hunting-and-herding did not lead automatically to agriculture. The archaeological record has in fact examples of societies that 'reverted' to less intensive modes of subsistence, such as the late Natufians compared with the early Natufians in South-West Asia, and the return to hunting by people in the Libyan Sahara after their experiments with herding Barbary sheep; and it must be likely that we shall discover more examples as regional data sets expand and chronologies improve. Subsistence systems incorporating animal and/or plant husbandry 'could well have been widespread in appropriate environmental contexts in the late Pleistocene and early Holocene in many parts of the world, and had no necessary trajectory in the direction of agriculture in any particular case'. Nevertheless, whilst forms of resource exploitation and management that shared some of the characteristics of animal and plant husbandry were clearly being practiced by our species in the Pleistocene, it seems only to have been at the boundary of the last glacial/interglacial cycle 20,000-10,000 years ago that factors converged in such a way as to stimulate some societies to develop modes of behavior recognizably closer to our modern definitions of food production and farming (7).

III.3. Explaining Agriculture - Some Theoretical Aspects



The domestication of plants and animals was one of the most important steps forward taken by mankind, and although it was first achieved so long ago we still need to know what led to it and how, where, when, and why. Only when we

have this understanding will we be able to appreciate fully the advent of agriculture and animal herding in the Old World and, along with it, in Pakistan. Among the host of unsolved questions are: what triggered the emergence of agriculture around 8500 BC and why did it not evolve earlier? Do crop and livestock species stem from a single domestication event or from multiple independent domestications? Can areas of food production be segregated into primary and secondary homelands, the latter describing areas where the arrival of primary homeland crops triggered local domestication? How did food production spread? Why were large domestic mammals predominantly Eurasian? And how can we gain a better understanding of the history of domestication of particular species? These theoretical issues with regard to domestication and the beginning of agriculture have been vexing the minds of scholars for the last fifty years. We touch upon a few of them in the followings before we turn to the mother-of-all-questions: Why agriculture?

A theoretical understanding of the causes and processes of domestication of plants and animals is particularly essential for the full appreciation of the spread of agriculture and the development of farming villages that lead to the urban civilization in Mesopotamia, the Indus Valley, and China. That is why that archaeologists have been so interested in circumstances under which gatherers and hunters settled down and then began to farm and herd animals, and why this process took place throughout the world in a relatively short period of time when measured against the full length of human history.

The literature on the the origins and spread of agriculture is immense. Most of these books and articles concentrate on the question of when, what, and where, leaving the question of how and why generally unanswered. A few books and review articles are, however, exception. One such attempt is by Graeme Barker, *The Agricultural Revolution in Prehistory: Why Did Foragers Become Farmers?* published in 2006 (7). We take full advantage of this discourse in the preparation of this chapter. Of course, there are a few other authors, such as Gregory Possehl (126) and Weisdorf (142), who have also touched upon this topic and we shall make appropriate references to them.

Why then but not earlier? It was assumed from early on that agriculture brought such clear advantages to the early farmers that once "invented," agriculture spread rapidly among prehistoric human communities, its progress stalling only where hostile environmental conditions intervened. In this case, given the great advantages of settled life, the question arises as to why settled agriculture was not a previously available option. What made it so impossible for early people to put a roof over their heads and enjoy the abundance of food production? What had to happen to make the transition to settlement and agriculture possible? Why did ‘modern’ humans need to spend so many years wandering in the wilderness before conceiving the benefits of settled life and secure food supply? This is a complicated issue and the answer to this question may never be known. A change in climate has been offered as a partial explanation.

It has been amply elucidated in the foregoing sections that early humans followed several independent trajectories of subsistence intensification, beginning during the Holocene and often leading to agriculture. No plant-rich intensifications are known from the Pleistocene, even from the late Pleistocene when human populations were otherwise quite sophisticated. Recent data from ice core climate proxies show that last glacial climates were extremely hostile to agriculture - dry, low in

atmospheric CO_2, and extremely variable on quite short time scales. Richerson et al. argue (119) that agriculture was impossible under these conditions. The final amelioration of the climate was followed immediately by the beginnings of plant intensive resource use strategies in some areas, although the turn to plants was much later elsewhere, and agriculture became the dominant strategy in all but marginal environments. Thus, the dictates of climate played a dominant role in this transition.

A favorable change in climate is, however, not the full story. Fossil evidence, such as the wild maize pollen from peat below the City of Mexico with a radiocarbon dating of 80,000 years, shows that the domesticable plants were available long before their domestication took place. The problem is thus taken out of the botanist's sphere and handed firmly back to the ethnologist and social anthropologist. It seems that one may need to bring in concepts of the correct stage of sociological or tool-making development in order to explain this, and since we have already stated that agriculture needed a settled mode of existence before it could begin, we must assume that man did not develop such a settled mode of existence until some 9000 years ago, and then only in certain places. When this stage in human development was reached agriculture could then begin. Mithen (137), a physiologist who focuses on the capacity of the human brain, argues that early humans, despite possessing knowledge about how plants and animals reproduce, simply lacked the imagination to domesticate plants and animals. Hence, in Mithen’s view, the origins of agriculture 10,000 years ago are best explained by a fundamental change in the way the human mind conceived of nature. Thus, there could be several factors that determined the onset of domestication and agriculture; the controversies revolve mainly around their relative importance.

One factor is the decline in the availability of wild foods. The lifestyle of hunter-gatherers has become increasingly less rewarding over the past 13,000 years, as resources on which they depended (especially animal resources) have become less abundant or even disappeared. A second factor is that, just as the depletion of wild game tended to make hunting-gathering less rewarding, an increased availability of domesticable wild plants made steps leading to plant domestication more rewarding. For instance, climate changes at the end of the Pleistocene greatly expanded the area of habitats with wild cereals, of which huge crops could be harvested in a short time. Those wild cereal harvests were precursors to the domestication of the earliest crops, the cereals wheat and barley, in the Fertile Crescent, probably also in the valleys of Baluchistan and Turkmenia, at least in the case of barley. Still another factor tipping the balance away from hunting-gathering was the cumulative development of technologies on which food production would eventually depend technologies for collecting, processing, and storing wild foods.

A fourth factor was the two-way link between the rise in human population density and the rise in food production. In all parts of the world where adequate evidence is available, archaeologists find evidence of rising densities associated with the appearance of food production. Which was the cause and which the result? This is a longdebated chicken-or-egg problem: did a rise in human population density forced people to turn to food production, or did food production permited a rise in human population density? In principle, one expects the chain of causation to operate in both directions. This bidirectional link between food production and population density explains the paradox that food production, while increasing the quantity of edible calories per acre, left the food producers less well nourished than the hunter-gatherers whom they succeeded. That paradox developed because human population densities rose slightly more steeply than did the availability of food.

Taken together, these four factors help us understand why the transition to food production in the

Fertile Crescent began around 8500 B.C., not around 18,500 or 28,500 B.C. During this time, hunting-gathering was still much more rewarding than incipient food production, because wild mammals were still abundant; wild cereals were not yet abundant; people had not yet developed the inventions necessary for collecting, processing, and storing cereals efficiently; and human population densities were not yet high enough for a large premium to be placed on extracting more calories per acre.

If today we had to choose an explanation for the origins of domestication and agriculture, we would adopt one of the moderate environmental approaches as the most robust because it explains the most real cases. Most such approaches also consider cultural factors, but they assign the greatest weight to the forces of nature. For us, that's their greatest appeal. They don't require researchers to assume that just because we're biocultural animals, humans are somehow exempt from natural factors that affect all living things.

Ultimately, we have no reason to believe that the origins of domestication and agriculture can be explained *only* by natural forces or *only* by cultural factors. These are complex problems for which there may even be multiple valid explanations. It could easily be the case that approaches such as those recently proposed by Barker and Verhoeven, which seek explanations in the interaction of both natural and cultural forces, will prove to be the most productive route to follow.

As a final note, the accepted dates for domestication suggested that the process had been going on continuously for at least 10,000 years. Therefore, Higgs and Jarman argued, our approach to the transition from hunting to farming should be to view domestication as a *process* rather than as an *event*. And if morphological changes in animals and plants were indeed showing domestication, such changes must in any case represent a late stage in the process, not its beginning. The transition from hunting to farming needed to be understood in terms of gradually evolving relationships between people, animals, and plants. In short, it was illusory to expect to identify, by searching for the first domesticated corncob or sheep bone, some precise moment in human history when foragers decided to take their first steps as farmers.

So what is the chronological scale encompassed by the 'agricultural revolution'? The answer to the question 'how far back does farming go?' depends of course on what particular activity or activities along a long and complicated spectrum of potential behaviors we choose to define as the beginnings of farming (or agriculture, herding, horticulture, and husbandry) or to discussed the question: Why now, not then? In terms of modern biological definitions of domestication, the key threshold is when the plant or animal cannot survive and produce offspring in the wild, but as the archaeological record considered previously noted makes clear, focusing on this alone would take out of consideration a huge range of novel relationships between humans, animals, and plants that have to be understood within any holistic model of forager-farmer transitions. In many evolutionary models of plant cultivation, the decision to prepare ground and plant crops, as well as to tend and harvest the latter, is seen as a defining moment, though there are examples of foragers doing both. In the case of animals, Zeder (151) proposes that the critical threshold was not so much when managed herds were isolated genetically from wild populations, but when humans started to intervene deliberately and systematically in the life cycle of target species, manipulating herd structures in order to promote herd propagation. As Layton *et al.* (152) commented, however, 'at some point along a continuum of movement into intensive husbandry it may be possible to say that cultivation [or herding] has begun, but we regard undue attention to this point as an error associated with the concept of evolutionary stages'. In one sense, husbandry is as old as the history of *Homo sapiens sapiens*.

Burning the landscape to enhance food supplies is certainly as old as the first modern humans who reached South-East Asia (at least) 45,000 years ago, and possibly as old as 100,000 years in Africa on the evidence of Klasies River Mouth, though all the other indicators of modern human behavior are not observed in the African archaeological record until about 55,000 years ago. It would appear that, pretty much from the outset, modern humans were thinking about their environment and their place within it, and putting their mark on the landscape, in very different ways from earlier species such as *Homo erectus* and Neanderthals. Even on a minimalist interpretation of the evidence for 'landscape intervention', 'domestication was accompanied by a prior empirical environmental consciousness'.

At the same time, though, to return to the comments made earlier, there was no inexorable path to agriculture, no unstoppable progress along an evolutionary spectrum from low-input mobile foraging to intensive sedentary farming. Hunting-andhorticulture and hunting-and-herding did not lead automatically to agriculture. The archaeological record has in fact examples of societies that 'reverted' to less intensive modes of subsistence, such as the late Natufians compared with the early Natufians in South-West Asia, and the return to hunting by people in the Libyan Sahara after their experiments with herding Barbary sheep; and it must be likely that we shall discover more examples as regional data sets expand and chronologies improve.

Multiple Versus Single Domestications: A long-standing question concerns whether each crop and livestock species stems from a single domestication event within a restricted geographic area, or from multiple independent domestications at different sites. An accumulation of recent evidence suggests the following generalization (103): that the former interpretation applies to most major Eurasian crops, the latter interpretation to many New World crops and the major Eurasian livestock species.

Among New World crops, many are represented by distinct but America, Mesoamerica States, leaving no doubt that related species were domesticated independently in these areas (for example, beans, chenopods, chille peppers, cotton, squashes, tobaccos and possibly amaranths). Multiple independent domestications are attested within the same species for the chille pepper species *Capsicum annuum*, common bean *Phaseolus vulgaris*, lima bean *Phaseolus lunatus* and squash species. Conversely, the eight crops that founded Fertile Crescent agriculture, with the possible exception of barley, each seem to derive from only a single domestication event, although opinions differ (104-108). Evidence for separate independent domestications in western and more eastern parts of Eurasia are now available for all of the 'big five' domesticated mammals (cow, sheep, goat, pig and horse), plus one of the 'minor nine' (water buffalo) (109-117). For example, cow was domesticated independently in the Fertile Crescent (yielding modern humpless cows), in Baluchistan and western Sindh (yielding modern humped Zebu cow) and perhaps in North Africa (109,113,116).

There has been a common belief among the early archaeologists who proposed that except for barley and flax, the wild ancestors of the Fertile Crescent founder crops had restricted geographic ranges confined to the area between modern Turkey and western Iran, while chickpea was even more narrowly restricted, to southeastern Turkey. Those small geographic ranges, plus the rapid spread of domesticates along Eurasia's east–west axis, meant that once a wild plant had been domesticated, it spread so rapidly that further independent domestications of the same or related species were pre-empted. The large Eurasian mammals, however, had such wide geographic ranges (in the case of pigs extending for 13,000 km from Spain to China) that there was ample time for independent domestications at locations west and east of each other. In the New World, even though all the

homelands of agriculture lay within only 4000 km of each other, the slowness of crop diffusion along the New World's north–south axis meant that repeated independent domestications were frequent. So slow was that diffusion that the New World's main animal dorelated species in South and the eastern United mesticates - the llama and guinea pig of the Andes, and the turkey of Mexico - had not even spread the mere 2,000 km north to Mexico and south to the Andes, respectively, by the time that Europeans arrived in AD 1492 (103).

Such a pictorialization of domestication of plants and spread of agriculture is still popular among a majority of scholars but dissenting voices have begun to be heard from several directions, plant and animal geneticists taking the lead. We have already discussed this issue in Chapter IV.1 and IV.2 in ample details shall come to it again as we proceed.

Primary Versus Secondary Homelands: In several parts of the world, food production arose only upon the arrival of domesticates from the primary homelands, whereupon people proceeded to ing of multiple homelands. We are going to dealt with this possibility in Chapter 5 of the next Section.

For some scholars independent origins of food production seem indisputable for five of the candidates (the Fertile Crescent, China, Mesoamerica, South America and eastern United States), because they were the earliest sites of domestication in their respective parts of the world. But questions have been raised regarding the independence of the other four candidates often included in this category. Especially uncertain is the status of Ethiopia, where it is unknown whether several undoubted local domesticates (teff, coffee, finger millet, chat, noog and ensete) were cultivated before or only after the arrival of Fertile Crescent domesticates, and the New Guinea highlands, where remains of irrigation and drainage systems attest to early agridomesticate some local wild plants or animals that had not been domes ticated elsewhere (105). Clear examples of such 'secondary' homelands, in which local domestication was triggered by the arri val of ‘Fertile Crescent crops’, were Europe (lo cal domestication of pop pies and possibly oats), Egypt (chufa and syca more fig), and India (In dian pulses and probably rice).

Therecognition o f t h o s e s e c o n d a r y homelands requires us to reconsider the supposed primary homelands. On the one hand, some of the primary homelands

may better be viewed as consisting of multiple homelands in which dis tinct systems of food pro duction arose nearby but



independently of each other. This is especially true for the homeland of Andes/Amazonia, which actually comprised primary highland sites in the Andes as well as primary lowland sites scattered from Panama through the Amazon Basin to the Pacific coast of Ecuador and Peru. Similarly, the Fertile Crescent homelands may have consisted of a mixture of highland and lowland sites, while China probably included northern and southern sites in the Yellow River and Yangtze River basins, respectively, as well as coastal lowland and interior upland sites. Even the whole Middle Asia - ranging from the Fertile Crest to the Indus Valley and from the Zagros Mountains to southern Turkmenia - can be considered as a one single interaction zone consistculture but where the first crops grown remain unidentified and the earliest dates of food production remain disputed. The independence of even the eastern United States has been challenged recently, but the evidence seems compelling that Mexican crops arrived there only by way of southwestern United States and only long after local eastern origins of domestication. Similarly, in southern India the exact dates of arrival of Fertile Crescent domesticates and of earliest cultivation of local domesticates remain uncertain. Thus, some of the candidates for primary homelands may actually be secondary homelands in which domestication was triggered by the arrival of domesticates or of farmers from else

where.

Why so few wild species were domesticated: The wild animal species that most plausibly could have yielded valuable domesticates were large terrestrial mammalian herbivores and omnivores, of which the world holds 148 species weighing 45 kg or more (103). Yet only 14 of those 148 species were actually domesticated, prompting us to ask what prevented domestication of the other 134 species? Similarly, worldwide there are about 200,000 wild species of higher plants, of which only about 100 yielded valuable domesticates. Especially surprising are the many cases in which only one of a closely related group of species became domesticated. For example, horses and donkeys were domesticated, but none of the four zebra species congeneric and able to interbreed with them.

The key question concerning this selectivity of domestication is as follows: in the cases of all those species never domesticated, did the difficulty lie with the species itself, or with the people indigenous to the area to which the species was native? For instance, is the abundance of large wild mammals the reason why no mammal species was ever domesticated in subequatorial Africa, making domestication superfluous for Africans? If that explanation were correct, then African people should also have ignored Eurasian domestic mammals when those were finally introduced to Africa, and European animal breeders on arriving in Africa should have succeeded in domesticating some African wild mammals, but both of those predictions are refuted by the actual course of history.

Six independent lines of evidence converge to prove that, in most cases, the obstacle lay with the species itself, not with the local people: the rapid acceptance of introduced Eurasian domesticates by non-Eurasian peoples; the rapid ancient domestication of the most valuable wild species; the repeated independent domestications of many of them; the failure of even modern European plant and animal breeders to add significantly to our short list of valuable domesticates; ancient discoveries of the value of thousands of species that were regularly harvested in the wild but that never became domesticated; and the identification of the particular reasons preventing the domestication of many of those species (103).

Comparisons of domesticated wild species with never-domesticated close relatives illustrate the subtle factors that can derail domestication. For example, it is initially surprising that oak trees, the most important wild food plant in many parts of Eurasia and North America, were never domesticated. Like wild almonds, acorns of most individual wild oaks contain bitter poisons, with occasional non-poisonous mutant trees preferred by human foragers. However, the non-poisonous condition is controlled by a single dominant gene in almonds but polygenically in oaks, so that offspring of the occasional non-poisonous individuals are often nonpoisonous in almonds but rarely so in oaks, preventing selection of edible oak varieties to this day. A second example is provided by the European horse breeders who settled in South Africa in the 1600s and - like African herders for previous millennia - tried to domesticate zebras. They gave up after several centuries for two reasons. First, zebras are incurably vicious, have the bad habit of biting a handler and not letting go until the handler is dead, and thereby injure more zoo-keepers each year than do tigers. Second, zebras have better peripheral vision than horses, making them impossible even for professional rodeo cowboys to lasso (they see the rope coming and flick away their head).

Among wild mammal species that were never domesticated, the six main obstacles proved to be a diet not easily supplied by humans (hence no domestic anteaters), slow growth rate and long birth spacing (for example, elephants and gorillas), nasty disposition (grizzly bears and rhinoceroses), reluctance

to breed in captivity (pandas and cheetahs), lack of follow-the-leader dominance hierarchies (bighorn sheep and antelope), and tendency to panic in enclosures or when faced with predators (gazelles and deer, except reindeer) (103). Many species passed five of these six tests but were still not domesticated, because they failed a sixth test. Conclusions about non-domesticability from the fact of non-domestication are not circular, because these six obstacles can be assessed independently.

Acommonthreadrunningthroughthe search for general explanations for the beginnings of farming has been that particular plants and animals were naturally suited to domestication, and particular places to be the ideal theaters for domestication. The argument is that certain species were long recognized by humans as useful food sources and were exploited by them, and were used to being predated on by humans, for long periods before domestication, so there were few barriers to their domestication. Many of the cereals and legumes, for example, were self-pollinating, were edible without needing processing to remove toxins, gave high yields, could be easily harvested, were suitable for storing, and required little genetic change to develop properties essential for developed horticulture such as quick germination rates and tough stalks. Of the *ca.*150 big (over 100 pounds) terrestrial herbivorous animals, only 10 per cent are recognized as successful domestications: sheep, goat, cow, pig, horse, Arabian camel, Bactrian camel, llama, alpaca, donkey, reindeer, water buffalo, yak, Mithan cow, and Bali cow. All these animals have turned out to be successful at living with humans, and being managed by them, in terms of their diet, growth rates, mating habits, disposition, and social organizations (6). In particular, the wild ancestors of all these animals, as well as the dog, were herd animals rather than species living as isolated breeding groups and solitary individuals, so they were accustomed to the internal social dynamics of the herd, in which humans could replace lead animals in dominance hierarchies.

As Hawkes put it (36), these plants, ancestors of our cultivated plants, were opportunists; they needed to germinate and grow quickly when the rains came in the spring and when the ground warmed up, but equally, they needed to complete a full life cycle and mature their seeds before the ground dried out in the summer. Thereafter the seeds lay dormant in the soil, germinating perhaps a little in the autumn rains, and growing again in the spring to set a new crop of seeds in the early summer. At the same time they were extremely sensitive to competition from other vegetation and for this reason were restricted to areas such as I have just described.
It is interesting to note that most of the ancient Old World seed crops were domesticated in the mountains of the subtropics from about 25° to 45°N where these climatic conditions, with a cold winter, wet spring and autumn and a hot dry summer are to be found. The seeds needed to survive the long hot dry season in a well-baked thin soil, and there must consequently have been a strong selection pressure for large seeds with large food reserves to resist the drying out and grow quickly when the rains came again. In these soils and under these conditions nothing with small seeds would survive well, but nor would large perennial plants either, so these ecological weeds, the ancestors of our cultivated plants, were able to grow and survive under these special conditions without competition from trees or herbaceous perennials.

Such plants, as we have already stated, were pre-adapted for cultivation, and with their weedy tendencies, their need for "open" rich soil conditions, naturally colonized the bare ground and rubbish heaps provided by man. Since they had already evolved large food reserves they were of particular interest to man, who no doubt ate them in preference to the smaller-seeded weeds and wild plants when he could find them. We thus have the two / attributes here: (1) "weediness", and (2) large food reserves which enabled them to survive in very dry summer conditions in poor thin soil free

from competition with perennial plants. These two factors together seem to me to be the key to the domestication of Old World mountain seed crops.

To primitive man it must have seemed little short of miraculous to find that plants needed for food sprang up by his very huts and paths. Perhaps it is not too far-fetched to suggest that this situation might have been the basis for so many folk-legends which attributed the beginnings of agriculture and the introduction of useful plants to gods or supernatural beings.

Why Did Foragers Become Farmers? A number of studies have indicated that hunters and gatherers, even in very marginal environments, spend only a few hours a day obtaining enough food to satisfy their appetite; farming, on the other hand, is very labor intensive and much more time consuming. For subsistence hunter-gatherers consume less energy per capita per year than any other group of human beings. On this basis, Sahlin (50) and some other anthropologists have come to the conclusion that, contrary to the common belief, hunter-gatherers were an original ‘affluent society’ in which all the people's material wants were easily satisfied. Now, if the hunter-gatherers were so affluent, then why did they become farmers?

In the last three decades, a vast amount of information about early agriculture has been accrued from many different spatial and temporal contexts and from new techniques of analysis. This has contributed substantially to the current appreciation of where and when agriculture began. This new corpus of information has, however, failed to provide a sound basis for the establishment of why agriculture was initiated. One reason probably was that to answer questions of how and why, not just what, where, and when, demands a globally comparative study informed by anthropology, social archaeology, archaeological science, and other relevant disciplines. It is a challenging undertaking and no one seems to have met this challenge. Of course, there are some tentative theories that attempt to explain the causes or the reasons for the Neolithic transition and to answer the question why agriculture began. Along with this objective enquiry, we also have to try to imagine how the prehistoric foragers must have viewed their world and their place within it, issues that are only recently starting to be addresed.

The evidence of where and when wild plants and animals were domesticated for the first time is relatively well-established, as are the theories of how hunters and gatherers actually transformed wild plants and animals into domesticates. But the question: why did our ancestors decide to take up farming after millions of years of successful foraging? The number of suggested causes that has been proposed over the years for why prehistoric foragers might have become farmers appears almost endless, with everybody joining the party including the lunatic fringe. The following table, compiled by Graeme Barker (7), lists some of the suggestions. Archaeologists, agronomists, anthropologists, demographers, biologists and historians have speculated intensely about the factors that eventually tipped the comparative advantage in favor of farming. The following pages provide a brief survey of the hypotheses that have dominated the archaeological and anthropological literature. Following Garment Barker, we undertake here an historical preview before offering a consolidated summary of the current thoughts.

The development of agriculture around the globe entailed innumerable historically contingent decisions by individuals and communities confronted by what they perceived as risks and opportunities. But they took those decisions, of course, without knowing the likely outcome. As Graeme Barker has rightly emphasized (7), it is important that we do not fall into the trap of

evaluating those decisions with the benefit of hindsight - a tendency that has characterized so much thinking about the reasons for the agricultural revolution/ As Diamond warns (6), “what actually happened was not a *discovery* of food production, nor an *invention* ... food production *evolved* as a by-product of decisions made without awareness of their consequences”. The archaeological record of forager-farmer transitions must embody many unwise and foolish decisions, including fatal miscalculations, not just successes.

Too often, debates about the transition from foraging to farming are still characterized by an evolutionary approach to the past that, though more subtly expressed, is not so very different from the

Some of the causes that have been pro
posed for the transition from foraging to
Table 10.1. Some of the causes that
farming (7)

*Why did Foragers become Farmers?*Victorian notions of ladders of cultural progress with383

which we began this Section: that those prehistoric foragers who intensified their subsistence in ways have been proposed for the transition fromthat we can recognize would in time become food

foraging to farming production were doing so because (implicit in the reasoning though never so crudely expressed) they half-knew they were on the road to the eminently

aliens desirable goal of becoming farmers. In fact, as the big men regional case studies have shown, it seems more broad spectrum
adaptation

likely that in many instances foragers were attempting to *preserve* their way of life at a time of stress, circumscription rather than deliberately seeking to *transform* it. As climatic change Rowley-Conwy (Rowley-Conwy, P. 2001. *European*

competition

Mesolithic . In *Encyclopedia of Archaeology. History and Discoveries* vol. 2.) commented in the case of desertification the European Mesolithic, 'we know that agriculture

diffusion
was to appear [1,000 years later]. They didn't'. Moreover, as well as not having hindsight, prehis domesticability toric foragers certainly did not share in our post
energetics Enlightenment perspectives on their world, our 'infamiliarity

clusive ideology of the human mastery or appropriation of nature, whose roots lie deep in the traditions fat intake of Western thought' (153). That being so, what can feasting we discern from the distant perspective of our own

geniuses

world, about why most prehistoric foragers in time became farmers? In this exhaustive discussion, hormones Graeme Barker (7) identifis a series of underpinning intelligence themes all of which he believes have to be taken

kitchen
gardening
into account in any general theorizing about the agriculture revolution in prehistory. In the followings land ownership we attempt to summarize his thought on the submulticausalject.
marginal
environments
Early Thinking: In the eyes of the ancient Greeks, agriculture was the last of three stages: natural

natural
habitat 'First came a hunting and gathering stage; this selection

slowly led to the domestication of animals and a pastoral nomadic stage; finally came the invention nutritional stress of agriculture' (127). This 'stage' hypothesis peroases sisted in Europe throughout the Middle Ages. But plant migration whereas the Greeks envisioned a cyclical develop

population
population
ment, in which humans would eventually return to growth the beginning and start all over again, the medieval

pressure version, and even more so the view of the 18th cenrandom resource resource

genetic
kicks
tury Enlightenment, postulated an evolutionary sequence from less-advanced to more-advanced so concentration cieties in a linear fashion. Conjectural history,
pressure
wherein Enlightenment philosophers compared con

temporary living peoples whose cultures ostensibly rich environments differed in sophistication, and arranged these culrituals tures to form a logical sequence from simple to scheduling conflicts complex, was widely accepted.

sedentism

The view of 19th century scholars deviated very little from their 18th century counterparts. To storage Darwin (1868), who represented the prevalent view technological innovation at the time, agriculture was simply a practice waiting

water
access

to be discovered. He noted that "the savage inhabitants of each land, having found out by many and xenophobia hard trials what plants where useful, . . . would after

zoological
diversity

a time take the first step in cultivation by planting them near their usual abodes. The next step in cultivation, and this would require but little forethought,

Adapted from Gebauer and Price, *1992b:* table 1. would be to sow the seeds of useful plants”. Under146

mixed farming (the cultivation of wheat and barley and the herding of sheep and goats) seems to have developed in this region very early in the Holocene.
underpinned the dramatic development of villages in and around

lying this view was the assumption that foragers were ever on the verge of starvation and that the quest for food absorbed their time and energy to an extent that prevented them from building moreadvanced cultures.

The Victorian Ladders of Progress: By the turn of the nineteenth century, Thomsen's system of classifying the collections of the National Museum in Copenhagen into three 'Ages' of Stone, Bronze, and Iron had been widely accepted as of universal validity for the pre-classical archaeology of Europe (50). It soon became clear that the Stone Age should be further divided into an Old Stone Age or Paleolithic, when flint tools were made by flaking and chipping, and Neolithic, when stone tools were also prepared by polishing. The separate identities of these periods, and the immense period of time encompassed by the former, were well recognized by the late 1860s.The evidence suggested that the Old Stone Age or the Paleolithic could be equated with a time of Ice Age hunting and gathering, and the New Stone Age or Neolithic with the first farming, or at least with the herding of domestic livestock. An intervening phase, the Mesolithic, was also proposed. The implication was that there must have been a period after the Ice Age when people were still living by hunting, fishing, and gathering but had started to congregate at some select places to live for extended time periods. During the same time, a universal cultural progression from primitive hunting to herding to farming to civilization was widely argued by contemporary Victorian prehistorians.

The beginnings of farming were regarded as an enormous leap forward in human progress. Farming allowed people not just to settle down and live in one place, but above all to own land and create surplus - the first steps to property ownership and capitalism that were the hallmarks of civilization. Contemporary foragers, and by analogy Stone Age hunter-gatherers, were in a 'state of nature', but with the development of agriculture 'man is in his "natural state, endowed with the high physical organization and progressive intellect given to him by nature”, so wrote, for example, Westropp in 1872. Farming, it seemed clear, was the seminal moment in the story of human progress when people first began to use culture to take control of nature. The principal advantage of farming over hunting and herding, it was argued, was in terms of increasing time to do things other than simply seek food to survive: hunters had no time, and herders not much, but farming brought greatly increased opportunities for self-improvement.

When it came to explaining *why* humans had advanced from hunting to farming, the Victorians invariably sought their answers in the uniqueness of the human spirit and in its inherent yearning for progress. Thus Westropp began his opening chapter of his *Pre-Historic Phases or Introductory Essays on Pre-Historic Archaeology*, published in 1872: “As it is in the nature of the development of

man, as an individual and collectively, to be progressive, it must of necessity follow that this development should be from a lower to a higher stage, from the weak, helpless state of infancy, to the maturity and power of manhood; from a rude and barbarous phase to a more refined civilization ... This upward development is the necessary result of the inherent and peculiar progressive power and improvable nature of man" (51). Man would gradually have become conscious of the advantages of domesticating animals and the sustenance they would provide if he tamed them.

By the closing decades of the nineteenth century, though, there was increasing evidence against the thesis of a universal sequence of development from hunting to herding to farming. Westropp himself, for example, pointed out that there seemed never to have been a pastoral phase in North America, whilst in marginal environments where cultivation was difficult or impossible, pastoralism was inevitably the end-point, with 'further progress in development necessarily checked'. However, the dichotomy between the hunting and farming lifestyles, the former nomadic, uncertain, and close to nature, the latter sedentary, reliable, and the basis for 'making culture', remained embedded in archaeological thought.

The Intellectual Shadow of Godon Childe: Without doubt, the dominant intellectual force in the study of Old World prehistory during the first half of the twentieth century was V. Gordon Childe. His first paragraph in *Man Makes Himself* dismisses the Victorian notion of universal progress (1936): "In the last century 'progress' was accepted as fact ... Now that optimism has received a rude shock ... Doubts as to the reality of 'progress' are widely entertained." He laid out the evidence for what he regarded as the two most significant revolutions in human prehistory: the invention of farming, which he termed the Neolithic Revolution; and the invention of cities and states, the Urban Revolution. His chapters on the Paleolithic show how far removed he was from Victorian notions of brute savagery. Although he acknowledged that the process of domestication must have eventually involved a wide variety of staple food crops around the world
- wheat, barley, rice, maize, yams, sweet potatoes, and so on - his standpoint was that he needed to restrict his discussion to the cereals wheat and barley, the agricultural basis of the ancient civilizations of the Mediterranean.

The first component of his argument was that the Neolithic Revolution must have happened where the wild ancestors of modern domesticated plants and animals were to be found. He knew that wild forms of wheat and barley were to be found from the eastern Mediterranean eastwards to at least Persia (the Iranian plateau), and though he acknowledged that distributions would probably have been altered by climatic change, he concluded that present distributions were probably a reasonable general indicator of past distributions. Significantly, wild goats and sheep of various species ranged over the same area, though their distributions extended outwards from the cereal range, the mouflon sheep in the Mediterranean islands, for example, the urial sheep in Afghanistan and northern Pakistan, and the argali sheep in the mountains of Central Asia. The expectation therefore had to be that the first farming and animal herding would have started in the 'Near East'.

Secondly, he argued, the fact that the Urban Revolution took place in the same region also made it inherently likely that farming began first here. The two most ancient civilizations of the world were the Sumerian in Mesopotamia (the alluvial plains of the Tigris and Euphrates rivers in Iraq), which developed from about 3500 BC, and the Egyptian in the Nile valley, known to have developed from about 3000 BC (dates based on the historical records of the two civilizations). Both civilizations were founded on agricultural systems based on the cultivation of wheat and barley, and animal husbandry

based especially on the herding of sheep and goats. The cultivation systems of both civilizations depended on irrigation, using the natural flooding cycles of the Nile, Tigris, and Euphrates, rivers that together made up what was termed the Fertile Crescent. Presumably, therefore, the beginnings of farming were also to be sought in the Fertile Crescent, before the development of the ancient civilizations. The Indus Civilization came to light much later.

The third and critical plank in the argument concerned the likely effects of changes in climate at the end of the Pleistocene. The melting of the ice sheets, he suggested, must have had a dramatic effect on global weather systems, shifting rainbearing depressions northwards and so bringing desiccation to the Near East. The extensive grasslands of Pleistocene times in the Fertile Crescent region would gradually have developed into a landscape of sandy deserts and isolated oases. As the landscape became more desiccated, both animals and people would have had to congregate in oases around the diminishing number of springs and streams. Each would have become accustomed to the other's proximity. As Near Eastern hunters were now also cultivators, the circumstances were in place for people to realize the benefits of protecting and managing animals instead of just hunting them. This is what scholars have termed Childe's 'oasis hypothesis'.

The approach based on environmentalism reflects the influence of environmental determinism that prevailed in the late eighteenth and early nineteenth centuries and which focused on environmental factors, especially climate, as the over-riding controls on human activity. There is no doubt that climate has played, and continues to play, a major role in determining the way society uses natural resources and there is increasing evidence that climatic change may have been a major stimulus for the emergence of agriculture. This evidence occurs in many forms and is widespread, ranging from polar to tropical ice caps, from temperate to tropical lake sediments and peats, and from polar to tropical ocean-sediment cores. For the period between 12,000 years and 9,000 years ago, as the last Ice Age drew erratically to a close, global temperatures warmed, cooled and warmed again. This created ecological instability which could hardly have failed to affect hunter-gatherer communities.


V.Gordon Childe (1892-1957)

There is further evidence that supports the environmentalism hypothesis. This concerns the work of

paleopathologists who have examined human skeletal remains from preagricultural and agricultural horizons in Southwest Asia. They reflect the effects of hard physical labor and poor diet; those from preagricultural horizons reflect a better diet and less wear and tear. The hard work that cereal cultivation and preparation required is supported by the patterns of wear found on grinding stones and mortars in the region and it has been suggested that people would only have turned to grasses, etc., as a source of food if other types of food became scarce. Moreover, the environmental changes of the period might have favored the spread of wild grasses as competition with shrubs and trees diminished and as their shading was reduced. This body of evidence does indeed point to climatic change as a significant factor in the initiation of agriculture.

The oasis theory suffers from two major shortcomings. First, it focuses very largely on animal domestication, and does not seek fully to explain the origins of plant cultivation, although stubble fields and fodder crops are an important part of Childe's model. In later writings, he argued that similar processes of environmental change and enforced proximity led to plant domestication and irrigation agriculture, but these arguments were less convincing. Second, the model was based on inadequate environmental information, which we now know that in West-Asia rainfall increased rather than decreased at the end of the Pleistocene (see Section I).

This hypothesis turned out to be contradictory as the early Holocene climate conditions were more conducive to enough rain and river water available throughout the Asian-African region. This situation might have caused the origination and expansion of agriculture and not the environmental pressure, as supposed in oasis model of Childe. Anil Gupta (52) thus suggest that it was climate amelioration during the early Holocene (10,000– 7000 years ago) and not the environment pressure that triggered the domestication of animals and plants throughout the tropics and subtropics. The favorable climate conditions with enough rains brought significant change in the ecology, leading to the exuberance of vegetation and diversification of the plant community.

By learning how to cultivate and herd, and to combine the two in systems of mixed farming, people were able to live in settled villages, and multiply rapidly. They invented new crafts such as potting and making textiles, and traded with each other. The nature of Neolithic agriculture favored movement, and the combination of semi-nomadic farming and rising populations, Childe believed, took the Neolithic Revolution from South-West Asia as a movement of people (Neolithic farmers) westwards right across Europe to the Atlantic and Baltic, to the south from the Nile into Africa, and eastwards eventually to Baluchistan and the Indus plains. He was careful to emphasize that the eventual change from hunting to farming was probably the climax of a long process, but he argued that, in the scale of the economic, social, and demographic change it represented, it surely remained a true revolution, the first in human history and the most profound in its consequences as the platform on which urbanism was created.

In *What Happened in History*, as in *Man Makes Himself*, Childe remained vague as to precisely how and why the hunters and gatherers of South-West Asia made the critical switch to farming, beyond suggesting that the advantages of cultivating and herding would simply have become obvious to them given the stress they were under from postglacial desiccation, and the effects of the latter in clustering people, cereals, and animals by springs in oases. However, as well as developing the theory of the Neolithic Revolution and the 'oasis hypothesis', these books were also important for the many other ideas they developed about the nature of prehistoric forager and farmer societies, ideas representing an enormous advance in understanding compared with the Victorians, and which have helped shape

the development of studies of the origins of agriculture ever since.

Childe was unconvinced about his oasis theory towards the end of his life, aware of new discoveries in South-West Asia of early farming communities not in the great river valleys but in the adjacent mountains. Also, in the later editions of *The Dawn of European Civilization* he pointed to evidence in many parts of Europe for Mesolithic foragers contemporary with, and in contact with, Neolithic farmers, each acquiring components of the other's material culture through barter or warfare. Clearly there was a need for caution in making simple equations between Mesolithic material culture and hunting-gathering, on the one hand, and Neolithic material culture and farming on the other.

An important if speculative book about the beginnings of farming published towards the end of Childe's career was Carl Sauer's *Agricultural Origins and Dispersals* (1952), which attempted to shift the focus of interest to South-East Asia. Sauer started out by positing that the beginnings of farming would be found amongst societies meeting a number of conditions. They would have a flourishing economic base, relying on gathering more than hunting, and on fishing. They would not be in major river valleys, where crop farming would be difficult because of flooding. They would be living in wooded rather than open country, because woodland soils could be cultivated with simple digging tools, whereas grassland turf could not. The location would have a wide variety of plants, fish, and animals. These conditions came together in SouthEast Asia. It must have been people here, he concluded, who first began cultivating root crops, then domesticating animals such as dogs and pigs. There was very little archaeological evidence in support of his theory at the time he was writing, but he suggested that the absence of evidence was because the prime coastal locations where agriculture had been invented were now under water, flooded by the higher sea levels caused by the melting of the glaciers at the end of the Pleistocene. He believed that the 'idea' of farming then spread westwards throughout the Old World, stimulating different societies to domesticate other crops and animals. Although the book was strong on speculation and short on data, it is interesting how in many respects modern research in mainland South-East Asia is supporting Sauer's ideas about the precocious nature of foraging-farming transitions in this part of the world (7).

Given the contradiction inherent in the oasis theory and a lack of archaeological evidence for Carl Sauer’s speculations, many theorists started emphasizing the importance of demographic processes, specifically some form of population pressure. The difficulty with these hypotheses is that they are rather vague about how much population increase or pressure is enough. Also, they fail to account why such pressure arose in only a few places in the early post-glacial period in various agricultural "hearths." The changes in social organization was another pivot around which a number of hypothetical webs were spun and which we shall discuss as we proceed. These factors can be categorized as exogenous (climate/environment and population) or endogenous (social change). Exogenous factors are generally natural forces over which human groups have little control; endogenous factors reflect internal change within society and represent decisions that humans make.

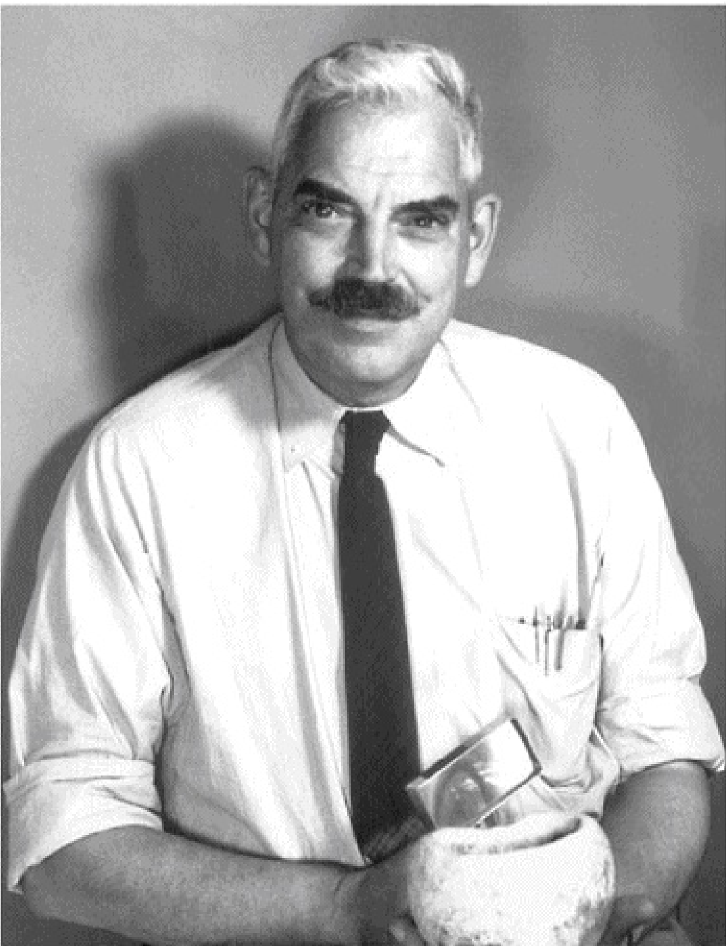
Physical and Biological Sciences to the Aid of Archaeology: The study of the origins of agriculture was revolutionized in the late 1950s and early 1960s by the application of archaeological science. In both the Old and the New Worlds, studies were undertaken of the modern distributions and biology of the plants and animals that were thought to be the 'wild progenitors' of domesticated plants and animals. From comparisons between modern wild and domestic species, archaeozoologists and archaeobotanists (archaeological specialists studying animal bones and plant remains, respectively) proposed criteria for recognizing signs of domestication in archaeological material. These

approaches came together in the late 1950s and 1960s in a series of archaeological expeditions, mainly led by North American archaeologists, in search of the origins of agriculture. The teams represented a new kind of interdisciplinary archaeology, with archaeozoologists and archaeobotanists working alongside the excavators. Many of the projects also combined survey with excavation, and where possible lake sediments were investigated for their pollen records.

Although the senior player in this program, Robert Braidwood, was particularly concerned to disprove Childe's oasis theory, a critical stimulus for most teams was the essay published in 1926 by the Russian botanist Nikolai Vavilov (*Studies on the Origin of Cultivated Plants).* Vavilov had argued that the center of origin of a crop was likeliest to be where the greatest genetic diversity was found today (now known, in fact, to be not necessarily true), as well as supposed wild ancestors or progenitors. On this basis he proposed eight primary centers, and several sub-centers. Two regions in particular were suggested as the most likely candidates for the earliest farming: South-West Asia (the Near East) in the Old World, for the domestication of wheat and barley; and Central America (‘Mesoamerica' as it came to be termed in the archaeological literature), for the domestication of maize.

In the Near East, the focus of the projects was not the Tigris and Euphrates plains but the surrounding hills - what came to be termed the 'hilly flanks of the Fertile Crescent'. Because modern wild cereals and sheep and goats were all upland species, the argument was that they would have been domesticated in the hills, not down on the plain. In his original objections to the oasis hypothesis of Gordon Childe, Braidwood (53) had pointed out that, even if wild cereals, sheep, and goats had been down on the plain in the Pleistocene, they would have migrated upwards into the hills in response to postglacial desiccation, not retreated to lowland oases. In any case, however, pollen analyses from the region were indicating that the early Holocene climate was characterized not by desiccation but by a warmer and wetter regime than in the Late Glacial, suggesting that the oasis hypothesis, at least in the form proposed by Childe, should be abandoned.

Braidwood and his team had started out expecting to find evidence that environmental change was a sig nificant factor in the adoption of farming, but because the ma jor climatic changes at the Pleistocene Holocene boundary were manifestly ear lier than early farm ing villages such as Jarmo, he concluded that the reasons



Robert J. Braidwood

must have been cultural. Final Paleolithic populations had begun to broaden their subsistence base (what was termed 'broad spectrum' hunting and gathering) in response to the environmental changes of the Pleistocene-Holocene transition. Their technology became more efficient, so people were able to extract more food from a given environment. Thus the stage was set for experiments with some of the plants and animals already being exploited, a short step away from husbandry. 'Why did incipient food production not come earlier? Our only answer at the moment is that culture was not yet ready to achieve it' (78).

The “New Archaeology” Explains the Pathways to Agriculture: The 1960s witnessed major changes in archaeological philosophy that were generally characterized then as the New Archaeology. The proponents of the New Archaeology argued that the discipline needed to become less like the humanities and more like the sciences in terms not simply of methodologies but also theoretical procedures. Using scientific principles of hypothesis testing, it was argued, the past could be reconstructed in terms of *systems* of social and economic behavior and *processes* of change in such systems (hence the other term for New Archaeology has become Processual Archaeology). Whereas cultural prehistorians had looked mostly to migration and diffusion as explanations for change, the New Archaeologists viewed cultures as adaptive systems and commonly sought explanations for cultural change either in external factors such as environmental change or the impact of new technologies, or in factors internal to a society such as population stress, social disintegration, elite competition, and so on. Implicit in New Archaeology's interest in process was a focus on long-term settlement histories and regional, rather than single-site, studies to understand settlement

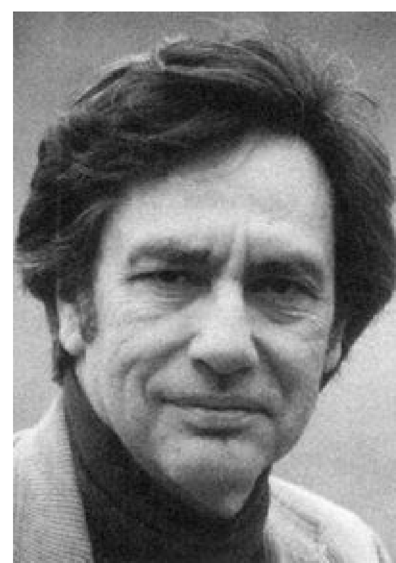
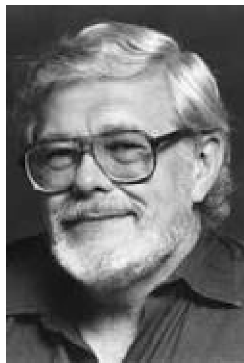
systems, interests that stimulated the development of multi-period regional projects integrating survey and excavation. The origins of agriculture became one of the principal theaters of engagement of the New Archaeology. The Tehuacan, Jarmo, and Deh Luran projects were typical in their integration of survey with excavation, of settlement archaeology with environmental archaeology, and their focus on the reconstruction of long-term demographic trends, settlement systems, and subsistence practices, to produce regional accounts of sequences of subsistence change, or 'pathways to agriculture'. In terms of theoretical debates about why foragers might have become farmers, two North American 'New Archaeologists' were particularly influential: Lewis Binford, and Kent Flannery.

The possible effects in South-West Asia of climatic change on population numbers, and of rising populations on subsistence systems, were debated in a famous paper by Binford (58). Binford asserted that ethnographic evidence indicates that in areas where environment and population have remained constant, a stable balance between the human population and food resources is achieved and people do not have to look for new sources or strategies of getting food. Such groups in fact tend to live at food consumption levels far below the resource potential of their environment. Two factors can upset the balance between people and food: stress produced by environmental change or by demographic growth. Binford identified two kinds of demographic stress - internal demographic stress, which occurs when the number of people within a community increase; and external demographic stress, caused by immigration into an area by people from another area.

In the context of the origins of agriculture, Binford emphasized external demographic stress. He argued that at the end of the Pleistocene era, as a result of a rise in sea levels, people living along the coasts migrated to less populated inland areas. This upset the people-food equilibrium in inland areas and gave an impetus to the search for new strategies to increase food supplies. The problem is that evidence of a migration of people from the world's sea coasts to inland areas at the end of the Pleistocene is lacking. Internal demographic stress may have been a factor in upsetting the people-food balance in some areas, but a question that can be raised is: can we really talk about 'over-population' and 'food crisis' in times when human communities were small and resources abundant.

There were many question marks about the model: the likely impact of sea-level rise on the subsistence behavior of coastal populations was unclear, and there was little or no archaeological evidence for the proposed migration into the hills. But the general thrust of the argument, of agriculture likely in some way to be the outcome of complex interrelationships between environmental change, changes in foraging behavior, changes in settlement patterns (especially increasing sedentism), and rising population levels at the Pleistocene-Holocene transition, has continued to be one of the most robust and long-lasting theories emerging from the New Archaeology.

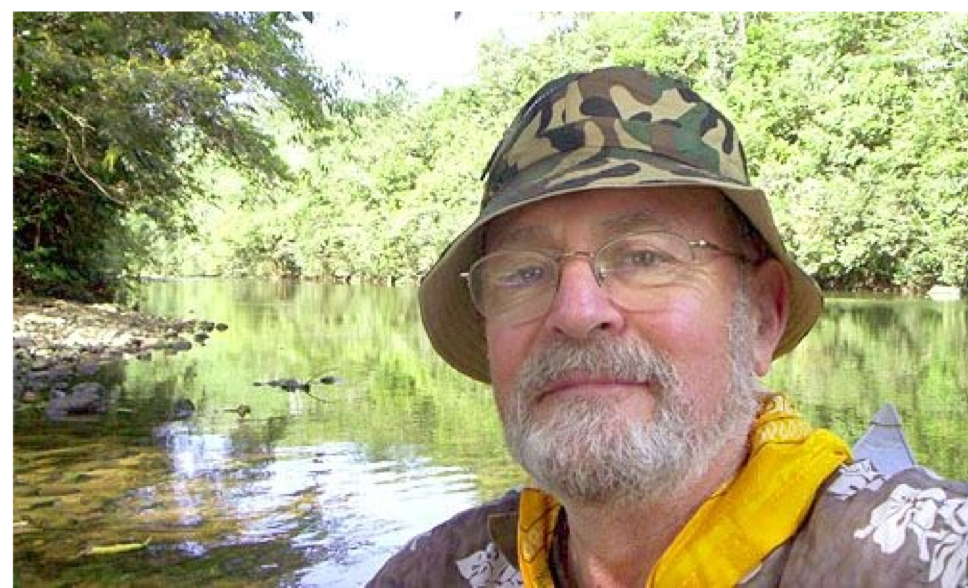
Kent Flannery explored these relationships in two papers on the beginnings of farming in South-West Asia in which, applying systems theory, he emphasized how complex interactions ('positive feedback mechanisms') were more

**Kent V. Flannery** **Lewis Binford**

likely to generate change than linear sequences of single causes producing single effects (79,80). Flannery shifted the focus from the search for an event that might have led to the beginnings of food production to the *process* of food production itself and the adaptive advantages of plant and animal domestication over foraging and hunting. He distinguished two types of

food procurement systems - negative and positive feedback food procurement systems. Negative feedback food procurement systems involve a balanced exploitation and use of various food resources within an area and discourage any change. Positive feedback systems are those in which the productivity of resources actually increases as a result of human interference and exploitation. Flannery gives the example of the maize plant: When people transplanted maize from areas within its natural habitat to other areas, over time the plants responded to the process of domestication by a series of changes such as an increase in the size of the cob and in the number changes resulting from the fertilization increased the productivity of this resource, and once people recognized this increased productivity, they turned more and more towards the domestication of maize. This hypothesis explains why people found agriculture more advantageous than food gathering, but it does not explain why the initial experiments in domestication were made in the first place.

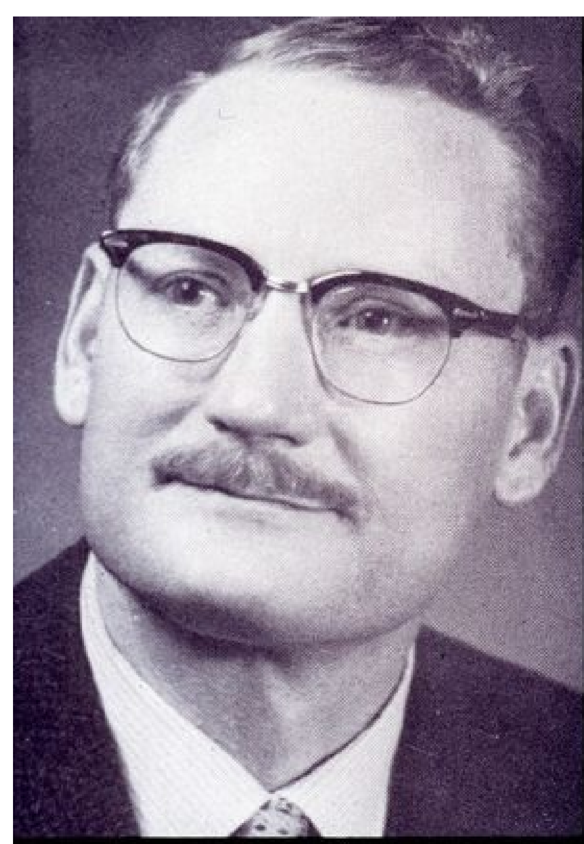
Flannery accepted Binford's general thesis, that Late Glacial environmental changes put existing broad-spectrum systems under pressure (though again, he was rather imprecise about exactly how), but he suggested that it would have been in the marginal zones that people would have been forced to intensify, whereas those in optimal resource-rich zones would have been able to cope. That such subsistence intensification took place at this time, he suggested, was indicated by the relatively sudden appearance *ca.*10,000 BC of harvesting and grinding equipment. The really significant change, though, was when people started soon afterwards to move plants and animals from their natural habitats to new ones (as for example to Ali Kosh, the site he excavated at the foot of the Zagros hills). He developed a feedback model on the same principles to account for the transition to farming and the development of social complexity in Mesoamerica.
of grains. Genetic process of cross

**Richard Lee '*How to make out on scarce resources*'**

The starting point for both Binford and Flannery was that there had to be a strong reason for people to abandon foraging and commit to farming. This perspective, developed also by Harris in two review papers (3,81), was in striking contrast to the main thrust of so much previous thinking about the origins of agriculture, that the reason foragers decided to become farmers was that they eventually realized the many obvious benefits it gave them in terms of secure food supply, leisure, and so on. Perhaps the defining event in this process of reappraisal was a seminar on modern hunter-gatherer societies entitled *Man the Hunter* (59*)* that destroyed the long-lived belief amongst most archaeologists that the hunting-gathering way of life was a desperate, uncertain, and perpetual search for food, to be contrasted with a farmer's life of security, ease, and leisure. One of the most influential papers was Richard Lee's on the lives of !Kung-San 'Bushmen' in the Kalahari desert, memorably entitled 'What hunters do for a living or how to make out on scarce resourcees' (59). Though nomadic, these people had a highly organized and predictable schedule of seasonal movements to exploit particular food sources. Also, they had no problem finding enough food - they had both preferred foods and less attractive contingency foods if supplies of the former ran low. Most striking of all was the fact that, in one of the most inhospitable places on earth for human settlement, collecting food only took a few hours a day, so most people spent most of their time at leisure - gossiping, gambling, and visiting relatives! Of course there was a downside: because they needed to stay mobile, the !Kung-San could own very few possessions, and given the need to keep their numbers in equilibrium with their food supply, infanticide was quite common. But *Man the Hunter* was an important reminder to prehistorians that the advantages were not wholly on the side of the farmers: simplistic explanations for the origins of agriculture on the lines of 'the advantages would have been obvious to any hunter-gatherer' were clearly inappropriate.

Another oft-quoted piece of field research at this time also fueled much skepticism. Using a prehistoric sickle, the botanist Jack Harlan (82) harvested some wild einkorn wheat in Turkey, collecting a kilogram of clean grain in an hour. At this rate, he calculated, over the three weeks the crop was ripe, a family of foragers could have harvested enough grain to meet their needs for a year.The obvious implication was: if wild cereals were so abundant, and so easy to collect, and if the foraging way of life was (on Th.e !Kung-San evidence) so predictable and relatively stress-free, wouldn't foragers just have stayed foragers unless there had been a very good reason to commit to agriculture? As Kent Flannery concluded at the end of a major paper at this time reviewing the state of research on the origins of agriculture (83), “since early farming represents a decision to work

harder and to eat more "third choice" food, I suspect that people did it because they felt they had to, not because they wanted to”. The wheel had come full circle from


Botanist Jack Harlan

Hodder Westropp's thoughts a hundred years earlier on how the change to farming represented our species' advance from a 'state of nature' to our 'natural state', using our high physical organization and progressive intellect to advance our culture.

The Genetic View of Crop Domestication: It has long been recognized that genetic analysis of crop plants has the potential to provide valuable information on the origins of agriculture (74). A modern crop is a relatively recent descendent from the wild populations from which it was derived and should preserve many of the genetic features of those populations. Hence, comparison between the genotypes of modern crop varieties and wild populations from throughout the natural range should indicate which wild populations are ancestral to the crop.

This approach became feasible in the 1990s when the development of high-throughput methods made it possible to type multiple markers in many individual plants. Multilocus analysis was first applied to einkorn, possibly the first crop to undergo domestication, through typing of 288 amplified fragment length polymorphisms (AFLP) in 338 wild and cultivated accessions (139). Phylogenetic trees constructed from the AFLP data showed that domesticated einkorn is monophyletic, all modern crop plants rooting back to a single point, indicative of their common descent from a single progenitor population of early domesticates. The early domesticates were genetically most similar to wild plants from the Karaadag region of southeast Turkey, placing the location of einkorn domestication within this area. Similar AFLP analyses subsequently revealed single origins for both tetraploid wheat (75) and barley (76), the former also located in Karaadag and the latter in the region of the modern Israel-Jordan border.

The first of these genetic studies was carried out before archaeology had fully revealed the

complexity of the domestication process. Without this information, the strict monophyly and narrow geographical origins suggested by these studies was taken as strong evidence for a rapid, localized model for agricultural origins (77). To take account of the growing archaeobotanical evidence showing that the transition to agriculture was a protracted, multiregional process, the model was subsequently revised by suggesting that the genetic analysis was accessing only the final stages of the domestication process. The monophyletic and localized event detected by AFLP typing was thus interpreted as emergence of a 'superior landrace', possibly one possessing a major domestication phenotype such as the tough rachis. It was argued that this scenario is compatible with a lengthy period of plant utilization before domestication, but the difficulty remained that the tight affinity between each modern crop and a single wild population was consistent with a gradual transition only if during this transition the plants ancestral to the superior landrace either did not cross-hybridize with wild plants or only cross-hybridized with their parent population. Neither scenario is likely unless the early cultivators possessed the ability to isolate their crops from wild plants or if these pre-Neolithic communities were much less mobile than previously thought.

The 'rapid, localized' paradigm remained in vogue despite its conflict with the archaeobotanical evidence, and even though computer simulations showed that the tree-building algorithms used to analyze multilocus data sets could not distinguish crops that are truly monophyletic from ones resulting from multiple independent domestications. Eventually, genetic evidence challenging the monophyletic model began to appear, in particular for barley, the crop that, before the single-origin paradigm, had generally been considered to be the one most likely to have arisen from multiple domestications because of the presence of two different tough rachis mutations among modern landraces. The first clear evidence that barley was domesticated more than once came from genotyping of chloroplast microsatellite markers and resequencing of a region linked to the tough rachis locus, both studies indicating that barley landraces fall into at least two genetically distinct clusters, each with a different geographical origin. More extensive resequencing, of 18 loci containing 684 single-nucleotide polymorphisms (SNP), gave greater clarity, showing that barley was domesticated not only in the IsraelJordan region but also in a region to the east of the Fertile Crescent, possibly in the western foothills of the Zagros mountains, where there are early farming sites at Ali Kosh and Jarmo, or further east, where no research has so far been conducted. This eastern domestication appears to have given rise to many of the landraces subsequently grown in central and east Asia. New information is also emerging for einkorn, the crop whose AFLP analysis established the predominance of the single-origin paradigm, resequencing of 18 loci in 321 wild and 92 domesticated lines revealing a complex relationship between the cultivated and wild versions of the plant, indicative of a multitude of independent domestication events. Similarly, with tetraploid wheat there is debate about the interpretation of the AFLP data and whether these, and more recent data on chloroplast haplotypes and restrictionfragment length polymorphisms, indicate that there were at least two domestications.

These new genetic data are confirming that, as indicated by the archaeobotanical evidence, the processes leading to domestication were multiregional rather than highly localized events. Attention therefore becomes focussed on a new challenge: understanding the genetic events that led to fixation of the domestication traits. This is an exciting area of endeavor that will require account to be taken of the complexities of gene flow between the plants being utilized by humans and adjacent wild populations, the latter possibly changing if cultivators move, taking grain with them. The agricultural and natural environments provide selective pressures that frequently are opposed and which will draw plants down different evolutionary paths. For example, artificial sowing pressure will increase seed

size but wild dispersal pressure will reduce it, and harvesting pressure favors the tough rachis whereas wild dispersal pressure favors the brittle version. The inter- action between these conflicting pressures, mediated by gene flow, will be determined not only by the selective conditions in the agricultural and wild environments but also by the mode of inheritance and genetic control of the domestication traits. Most domestication traits exhibit complex patterns of inheritance and are influenced by both genetic and environmental factors. Recently, forward genetics approaches coupled with quantitative trait analysis have been successfully deployed to identify genes responsible for morphological changes associated with domestication. Although the number of genes isolated is still relatively small, a theme appears to be emerging in which regulatory genes play the central role in development of the initial domestication syndrome whereas structural genes are important during subsequent selection for trait diversification (77).

Domestication as a Mutualist Relationship: Most studies of domestication tend to assume that it has to be explained by unique attributes of human behavior, but it is important to note that many animal species are characterized by 'commensal' or 'mutualistic' interactions between animals that in some cases have similarities to the animal and plant relationships represented in human husbandry. 'As far as plants are concerned, we're just one of thousands of animal species that unconsciously "domesticate" plants' (6). Examples of husbandry-like relationships include fruit bats propagating the seeds of the trees they feed on, and some species of fish guarding succulent algae on coral reefs. Mutualism is a relationship that benefits both species involved in the relationship, commensalism is where one species benefits without advantages or disadvantages for the other. The association of the house sparrow, mice, and rats with human habitation is an example of commensalism. An example of mutualism would be the birds that pick parasites off animals like cattle and crocodiles in Africa. The frequency of both commensal and mutualistic relationships confirms the gain in fitness they bring to the species involved. Domestication involved the development of a set of relationships between humans, plants, and animals, in which the interaction was either to the benefit of both species (mutualistic), or because it was beneficial to one and neutral to the other (commensal). Most such relationships were mutualistic. “People did not take sheep into domestication: rather, people and sheep entered into a particular interaction by behavioural adaptation on the part of both species. The new relationship succeeded precisely because it benefited both species” (5). nary success of the wheats and competing indigenous flora in the large areas of the The extraordibarleys, outglobe to which they have been introduced, and sustaining a large portion of the world's human population in the process, is a prime example of species mutualism (7).

Human history has many examples, though, of domestication processes that have not worked for both sides in the same way, and have failed the test of time. Examples we have encountered in the archaeological record have included gazelle in South-West Asia, floodplain weeds in North America, and Barbary sheep in North Africa. The ancient Egyptians appear to have tamed wild animals including gazelle and other antelope, ostrich, monkeys, and possibly leopard. Ostrich, red deer, and musk ox are all examples of wild animals that are now being farmed successfully, in the sense of being successfully bred and managed in captivity, and other recent domestication projects have targeted the elk, moose, zebra, and bison, though it is too soon to tell whether there are longterm prospects of genuine mutualism and of the development of the kind of acceptance of human presence that is a feature of normal farmyard stock (7).

Those operating within an evolutionary biology perspective, in particular, maintain that the relationship between humans and domesticates is no different from other mutualistic relationships in

the natural world that bring together species like ants and aphids in partnerships of increasing codependency. Moreover, as one moves further along the spectrum, from a relatively balanced mutualistic perspective to ones that focus on the domesticate, the role of deliberate human intent declines. The more extreme positions at this end of the spectrum tip the balance in favor of the domesticate, which is seen as manipulating its human partners for its own evolutionary advantage, ensnaring humans in a relationship that may have actually reduced human fitness (4).

It has been noted that domesticating plants and animals is a behavior which is not unique to humans and that many animal species are characterized by 'mutualistic' interactions between them and other animals and plants. In this respect, they have similarities to the human-animal and humanplant relationships represented in human husbandry (5). ‘'As far as plants are concerned, we're just one of thousands of animal species that unconsciously ‘domesticate’ plants”, declared Jared Diamond (6). An example of mutualism would be the birds that pick parasites off animals like cattle and crocodiles in Africa. Other examples of such a relationship would include the fruit bats propagating the seeds of the trees they feed on, and some species of fish guarding succulent algae on coral reefs. Mutualism is, thus, a relationship that benefits both species involved in the relationship.

CurrentViewson the Causative Factors for the Origin and Spread of Agriculture: The course of theoretical developments in explaining the origins of agriculture outlined above, especially those which attempt to answer the question Why, is interesting indeed. But where does it leave us with the answer? Unfortunately, we must admit that no single explanation appears to be universally applicable (126,134,136). Given the scope of agricultural revolution in human history it is quite extraordinary that there is no generally accepted model accounting for the origin of agriculture. This paradox is responsible for a profusion of models of the origin of agriculture. “Few topics in prehistory', noted Hayden, 'have engendered as much discussion and resulted in so few satisfying answers as the attempt to explain why hunter/gatherers began to cultivate plants and raise animals. Climatic change, population pressure, sedentism, resource concentration from desertification, land ownership, geniuses, rituals, scheduling conflicts, random genetic kicks, natural selection, broad spectrum adaptation and multicausal retreats from explanation have all been proffered to explain domestication and agriculture. All have major flaws ... the data do not accord well with any one of these models” (118).

In the following we attempt to consolidate the various theories which have any relevance to the current thought on this issue, and try to put some order in the vast literature that has recently appeared on this topic. Weisdorf (142) and Graeme Barker (7) have comprehensively reviewed this literature. Weisdorf’s basis is economical while Barker’s treatment is largely archaeological. Here we follow Barker (7). In essence, our treatment briefly reviews the principal themes that seem to be emerging from the studies cited above. In spite of all this effort, we may at the end still ask whether it is possible to arrive at an overarching explanation or set of explanations for why foragers became farmers.

As must be evident from the above, three factors are considered to have been primary in the origin and spread of agriculture: climatic or environmental change, population pressure, and changes in social organization. These factors have been briefly dealt with in their historical development in the above but they need a few additional comments. A consolidation of what has already been said is definitely needed.

Environmental Approaches: Most approaches to explain the origins of domesticated plants and

animals and the beginnings of agriculture identify one or more natural mechanisms, such as climate change, that may have promoted the biocultural changes documented in the late Pleistocene and early Holocene archaeological record of many parts of the world. The reasoning behind such hypotheses is that if some change limits a society's ability to feed its people, there typically are several options. The least disruption to everyday life can be achieved by reducing the population, extending the territory, or making more intensive use of the environment. Farming, of course, represents a more intensive use of the environment. Through their efforts, farmers attempt to increase the land's carrying capacity by harnessing more of its energy for the production of crops or animals that will feed people.

In their most extreme form, environmental approaches smack of *environmental determinism,* the notion that certain cultural outcomes can be predicted from - or are determined by - a combination of purely environmental causes. For example, as mentioned earlier, V. Gordon Childe himself conjectured that climate changes at the end of the Pleistocene increased Europe's rainfall while making southwestern Asia and North Africa much more arid. Humans, animals, and vegetation in the drought areas concentrated into shrinking zones around a few permanent water sources. At these oases, Childe hypothesized, the interaction between humans and certain plants and animals resulted in domestication of some species, including wheat, barley, sheep, and goats, which people then began to use to their advantage. The eventual result was the spread of sedentary village communities across the Near East.

Hypotheses based on any form of determinism tend to be relatively straightforward, which is both their strength and their weakness. Because they hold so many factors constant, it's easy to see how such approaches should work and why certain important outcomes should arise. The main drawback of such ideas is that their focus is typically too general to explain a given case because they omit the key contextual factors that are unique to a real event. In environmental approaches, such factors are often history and culture. What people are already familiar with and what they and their ancestors did in the past often, if not always, plays big role in their decisions. So, for example, a desert region might simultaneously sustain opportunistic hunter-gatherers, nomadic pastoralists, and farmers using special deep-planting procedures, or even lawn-mowing suburbanites willing to pay for pipedin water, not because these groups are unaware of the possibilities posed by alternative ways of living, but because they are living their traditional ways of life and they prefer them.

To return to what has come to be called Childe's Oasis Theory, its simplicity quickly enabled archaeologist Robert Braidwood to demonstrate that the predicted outcomes didn't exist in the archaeological record. Pollen and sediment profiles now confirm that at least some of the climatic changes hypothesized by Childe did occur in parts of the Near East prior to Neolithic times, and so they may have had a role in fostering new relationships between humans and other species in this marginal environment. Even so, both the causes and the apparent effects were complex. In places like the Near East, climate change that resulted in diminished or redistributed resources didn't directly induce people to become farmers, though it may have made farming one of the more reasonable options.

Environmentalapproachesidentifyforces external to humans as the active ingredients in the development of agriculture. In these hypotheses, human agency is primarily reactive. Something in the natural environment changes, and it makes life increasingly hard for hunter-gatherers. They react culturally to changed circumstances in various ways, some of which include incorporating a wider range of less-preferred foods in their staple diet and colonizing marginal environments. At some

point, they take up the alternative of applying cultural means to increase the production of one or more food species. So basically, these approaches envision the development of agriculture more as something that humans backed into from a lack of better alternatives rather than something they enthusiastically embraced.

While climate models were largely out of favor in the 1960s through 1980s, recent advances in paleo-environmental reconstruction have resulted in its rehabilitation as a primary player in agricultural origins. In particular, the now well-documented brief return to Ice Age conditions at about 13,000 years ago, known as the Younger Dryas, is increasingly featured as having played a key role in agricultural origins, with domestication coming about either during this climatic downturn as a way of coping with environmental degradation, or after it as a response to the following climatic amelioration and stabilization. One recent climate based model of agricultural origins even maintains that agriculture was a “compulsory” development of climatic stabilization and rise in ambient CO^2 following the final pulse of Ice Age climate in the Younger Dryas (7). This climatic episode decreased the yield of wild cereals and thus could have motivated the so-called Natufians communities of hunters and gatherers in the Levant to cultivate wild cereals (140). It has also been argued that because evidence indicates that sedentary communities emerged in the Near East up to 3000 years before the birth of agriculture, it was inevitable that the level of food procurement should increase, once the constraint on population growth imposed by nomadic life had been relaxed (141).

Looking at the global scale, a key driver of subsistence change was clearly climatic change, however uncomfortably that fits with the postmodern tendency to privilege individual human agency and to discount other factors shaping human decision-making as crude functionalism or environmental determinism. Certainly seed-plant cultivation in mid-latitudes, difficult or impossible in the markedly unstable climates, widespread aridity, and low levels of photosynthesis of the later Pleistocene, was favored by the more stable and wetter climates of the Holocene and the enhanced levels of photosynthesis. The profound climatic changes between the Last Glacial Maximum and the transition to the Holocene presented the world's population with enormous challenges and opportunities.

In some instances people had little choice, as in the case of their retreat from much of northern Europe and the Sahara in the peak conditions of cold and aridity 20,000 years ago. The same was true for people living in many coastal regions in South-East Asia, confronted by the post-LGM flooding of the Sunda shelf. The same climatic trend in the early Holocene, though, allowed people to move back into the Sahara as it developed into a landscape of lakes, rivers, and grasslands. In northern Europe some reindeer hunters followed the retreating herds northwards as the glaciers contracted after the LGM (Last Glacial Maximum), others developed new forms of subsistence adapted to the Boreal forests. In many parts of the world, foraging societies were forced to respond to significant changes in the distributions, densities, and predictability of various animal and plant resources generated by the climatic oscillations, such as the Younger Dryas stadial, and the early Holocene. Only some of their responses, however, were characterized by changes in behavior that turned out to have far-reaching and irreversible implications in terms of intensifications in systems of food production (7).

It appears, however, that if climate change played a significant role in domestication and agricultural origins, it did not do so in the simple stimulus-response way implied by many models that award environment prime mover status. Instead, climate change alternately helped push and pull people along a pathway toward domestication and agriculture, providing both opportunities and challenges

that people across the region met in various ways depending on highly localized circumstances.

Demographic Stress: A large group of researchers continues to look to increased competition for resources brought about by demographic stresses. Whether the competition resulted from natural increases in population density or from climatic changes, such as rising sea levels, increased rainfall, or lower average seasonal temperatures, they're seen as major factors that encouraged the domestication of plants and animals and, ultimately, the beginnings of agriculture. These explanations share the view that agriculture developed in societies where competition for the resources necessary to sustain life favored increasing the diversity of staple foods in the diet. For one reason or another, population control or territorial expansion may not have been feasible or desirable choices in these societies. For example, competition may have arisen from decreased human mortality rates rather than increased fertility or possibly even been driven by the increasing proportion of people living to an old age. The point is that people faced a "prehistoric food crisis" unlike most modern cases because it was a chronic problem that worsened over decades and showed no sign of ever getting any better. Concentrated in a restricted territory or faced with the dwindling reliability of once-favored resources, such hunter-gatherers might have taken up horticulture or herding to enhance the productivity or distribution of one or more particularly useful species. It was this economic commitment that eventually led to the emergence of true farmers.

Explanatory frameworks founded on notions of population dynamics and resultant resource pressures can be traced back to Binford's EdgeZone Hypothesis of the late 1960s (54). The issues of climatic change on population numbers, and of rising populations on subsistence systems, were debated in his famous 1968 paper, *PostPleistocene Adaptations* (55). He argued that population growth and food resources would generally have been in equilibrium in the Pleistocene, below the population-carrying capacity of a region. The rise in sea levels at the end of the last glaciation would have prompted food collectors living in coastal locations to rely increasingly on fish, migratory birds, and shellfish. As a result, they would have become more sedentary, and their numbers would have started to increase. To relieve population pressure on resources, some of these people would then have migrated into the adjacent, less populated, zones. Migration would have pushed population numbers above carrying capacity, necessitating subsistence intensification. The upland subsistence system already included the gathering of wild cereals and the hunting of wild sheep and goats, so new forms of exploitation - husbandry - were developed to produce more food.

Although he took issue with certain aspects of Binford's approach, Flannery agreed with the basic thesis because it explained why the earliest archaeological evidence of plant domestication should be found in what would have been marginal environments. Flannery described the increasing breadth of the Epi-paleolithic diet as a "broad spectrum revolution" in which hunter-gatherers turned to many kinds of food resources in order to make up for local shortfalls. Especially in marginal environments, this activity promoted the development of domesticates and, ultimately, the origins of true agriculture. The starting point for both Binford and Flannery was that there had to be a strong reason for people to abandon foraging and commit to farming. This perspective, developed also by Harris (33) was in striking contrast to the main thrust of so much previous thinking about the origins of agriculture, that the reason foragers decided to become farmers was that they eventually realized the many obvious benefits it gave them in terms of secure food supply, leisure, and so on. Perhaps the defining event in this process of reappraisal was a seminar on modern hunter-gatherer societies entitled *Man the Hunter* (59) that destroyed the long-lived belief amongst most archaeologists that the hunting-gathering way of life was a desperate, uncertain, and perpetual search for food, to be

contrasted with a farmer's life of security, ease, and leisure.

Probably the clearest and most influential development of this thesis was Mark Cohen's *The Food Crisis in Prehistory: Over-population and the Origins of Agriculture* (57). Why had so many societies become farmers at more or less the same time, in the opening millennia of the Holocene? Given the higher work load and, probably, poorer diet associated with farming, the main economic advantage seemed to be that it would have yielded more calories per unit of space than foraging. Cohen therefore argued that agriculture would only have been adopted under conditions when demand for calories was increasing, or when demand was out of balance with supply. As human populations grew in the later Pleistocene, pressure on food supplies was met first by expanding the territorial range of the species but then by subsistence intensification, in each case involving more work and a less palatable diet. By the late Pleistocene, societies all over the world were having to switch from hunting large mammals, 'a prized but scarce resource', to broadspectrum hunting and gathering of more plentiful but less palatable food sources. The climatic amelioration of the Holocene allowed population growth to speed up and soon produced a global food crisis that forced people to start the selective exploitation of a few plant species chosen not because they were particularly palatable but because they were productive and yielded food that was easily stored.Though rarely so unadulterated as Cohen's thesis, stress models based on combinations of ecological and demographic pressure were common in the 1970s' literature.

In all parts of the world where adequate evidence is available, archaeologists have found that increasing population densities appeared in relation to the emergence of agriculture (6). Population growth certainly explains why agricultural intensification could not have been reversed. Once the population has increased, the ‘ratchet effect’ makes a return to less intensive ways of food procurement impossible. However, the core ‘chicken-and-egg issue’ remains unresolved; did human societies domesticate plants and animals as an adaptive response to population pressure or did domestication give rise to a larger population?

One view has been that population growth followed the beginnings of farming: the use of domesticates meant more food, and more reliable food supply, thus enabling human populations to grow. The opposing view has been that growth in population, stimulated by other factors, forced people to become farmers, because rising populations meant the necessity for more efficient means of food production if starvation was to be avoided. An example of the former is the theory that sedentism developed in response to improvements in the availability of food sources, and that the consequent changes in annual resource scheduling were an important stimulus of flood-plain weed agriculture. An example of the latter is the theory proposed for South-West Asia that the early Holocene climate promoted an expansion in plant and animal resources, which stimulated human population growth, which in turn promoted sedentism, increased territoriality, and subsistence intensification resulting in agriculture.

The problem with such arguments is that the archaeological datasets and chronologies of any particular region are such that it is impossible to reconstruct demographic and subsistence changes (to say nothing of changes in local environments and in the wider cultural systems in which subsistence behavior was embedded) with anything like sufficient precision to enable a robust examination of their potential interrelationships. The result is that most scholars in recent years have tended to shy away from the role of demographic change in transitions to farming, though Binford has attempted to model this in the case of Europe, concluding that Holocene foragers there had to

undergo organizational changes (variously taking the form of complex forager societies or forager-farmers) once their numbers climbed above a 'packing threshold' of about nine people per 100 square kilometers. The context for population growth in the early Holocene might have been the slight relaxation of controls on fertility that sedentism made possible, but a straightforward causal link between sedentism and higher fertility is unlikely (7).

The fact that, at the global scale, population levels rose dramatically with the transition from the Pleistocene to the Holocene is not in doubt, nor that a general correlation can be observed between the ensuing rise in global populations through the Holocene and the development of societies based on agriculture and then urbanism. What also seems to be indisputable is a common link between sedentism and population growth, though as we have seen above, sedentism was not necessarily correlated with farming. However, beyond reflecting on the possible implications of general models of population growth, it is frustratingly difficult to plot the rate and scale of population growth, far less changes in age structures, at temporal and spatial scales that would be useful for advancing the debate about population increase as cause or consequence of agriculture.

There were many question marks about the model as originally proposed by Binford: the likely impact of sea-level rise on the subsistence behavior of coastal populations was unclear, and there was little or no archaeological evidence for the proposed migration into the hills. Similarly, the arguments offered by Masrk Cohen have been challenged on archaeological grounds. But the general thrust of the argument, of agriculture likely in some way to be the outcome of complex interrelationships between environmental change, changes in foraging behavior, changes in settlement patterns (especially increasing sedentism), and rising population levels at the Pleistocene-Holocene transition, has continued to be one of the most robust and long-lasting theories emerging from the New Archaeology.

Cultural Approaches: There are many scholars who do not agree that the roots of domestication and agriculture are to be explained by the operation of external environmental factors, all of which, by design, place human culture and agency in a passive role. These researchers deny that external factors like climate change, population growth, or resource pressure have any causative role in this transition. Instead, they contend that social and ideological factors may have pushed societies to come up with more food than could be readily obtained on a regular basis from natural sources (61). The reasoning behind these hypotheses is that human agency and culture alone may be sufficient and necessary to explain many of the fundamental changes documented in the archaeological record.

These scholars pose the question: How can these external forces really *cause* the transition to agriculture? Other options would have been available to human groups under changing conditions. Instead of adopting agriculture, why not intensify the procurement of wild foods or reduce the size of the population? Put another way, what advantages did farming offer to societies or individuals who brought about its adoption?

Bythelate 1970s doubts were beginning to appear in the literature about 'population pressure-cooker' models of why people became farmers, a critique that was part of wider theoretical developments in archaeological thinking that came to be termed PostProcessual Archaeology. Much of the critique of New Archaeology in general and of 'Cambridge paleoeconomy' in particular was led by Ian Hodder, himself a Cambridge-based archaeologist. Prehistoric societies, he argued, did not operate wholly as *Homo economicus* seeking always to optimize economic returns and to balance inputs with outputs in

the most cost-effective way. In our own societies, people take economic decisions for many reasons - need, greed, opportunism, charity, display, status, family loyalty, religious adherence, and so on. The behaviors of modern foragers and farmers are not simply adaptations to a given environment and population level, their economic decision-making is mediated through cultural needs and aspirations.

In the 1990s, cultural or social theories were proposed to explain why communities with stable populations and abundant resources also eventually introduced domestication. Hayden (139), for exam



Ian Hodder
Prehistoric societies did not operate wholly as *Homo economicus*

ple, envisions the rise of agriculture as resulting from what he calls 'competitive feasting'. His idea is that food was regarded as a source of social prestige and that early domestication took place in order to create delicacies for families or individuals who wanted to improve their social status. Hayden's hypothesis, however, has not received much support. It appears that early domestication unambiguously consisted of important foods rather than delicacies (120).

The social context of the transition from foraging to farming was developed further by Barbara Bender in an influential paper entitled '*Gathererhunter to farmer: a social perspective*' (61). Recent sedentary foragers such as those of the American North-West had most of the characteristics of tribal societies in the classic definition, rather than of the typical hunter-gatherer band: large band sizes, welldefined territories, food storage and control, elaborate ceremonial institutions, and positions of authority, the latter sometimes with even an element of descent from one generation to the next. She pointed out that there was increasing evidence in the Holocene in the period before farming began, in several parts of the world, for more or less sedentary societies living by hunting, fishing, and gathering, whose burials provided indicators of the same sort of social complexity as these recent American North-West foraging societies, such as individuals of apparently high status. From this perspective, she suggested, it was not so surprising that tribal forager societies had developed into tribal agricultural societies - the key social changes had already happened. She did not pose the obvious question challenging this argument: if these foragers were so successful at sustaining dense and socially complex populations, why did they decide to become farmers?

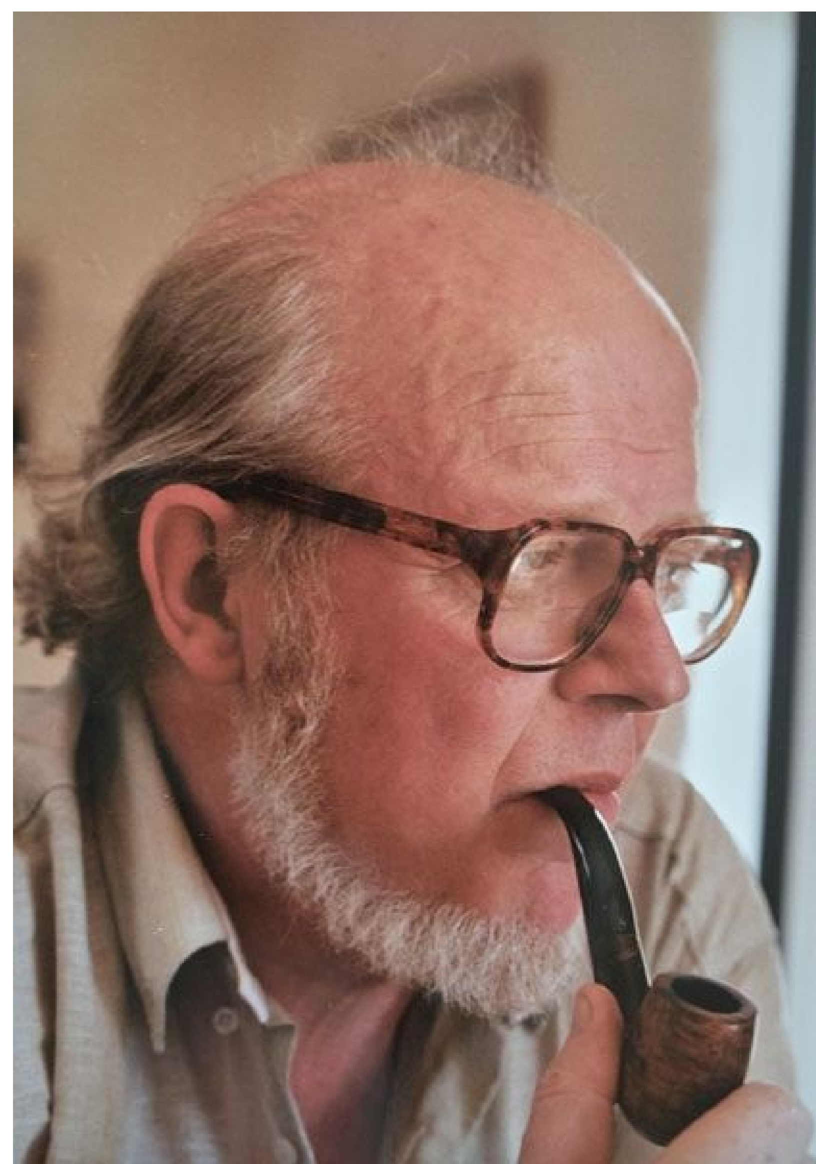
Sedentism, the business of settling down and maintaining significant habitations in one location for many months or years, has been consistently identified as a critical change in the behavior of many societies in the late Pleistocene and early Holocene. Accordingly, there has been much debate about whether it was the cause or consequence of early agriculture. Bruce Smith (120), for example, concluded the former: that the regions where the first agriculture began such as the Levantine corridor, the Sahel, and the eastern Woodlands of North America (for he argued that the first agriculture was based on seed plants rather than root crops or animals, though this thesis is not supported by the evidence of taro cultivation at Kuk in New Guinea and Barbary sheep herding at Uan Afuda in the Sahara) were all places characterized by rich aquatic habitats and the wild progenitors of future domesticates. This rich food supply meant that people were already living in "relatively large, permanent communities occupied throughout most if not all of the year ... a sedentary way of life, supported by the plentiful resources of an aquatic zone, seems to have been an important element in early experiments with domestication" (120).

As the archaeological record shows, however, sedentism could be both 'cause' and 'consequence' of farming, and neither. The intensive exploitation of rich marine and/or lacustrine and riverine resources certainly sustained many more-orIess sedentary foraging communities in the early Holocene, for example in parts of north-west Europe, the Nile valley, Japan, the Bolan Valley of Baluchistan, the eastern Woodlands, and coastal Peru, amongst whom agriculture developed later. Equally, sedentism was normally associated with the development of the first major commitment to the use of domestic plants and/or animals as staple foods, as in the case of Near Eastern PPNB villages. However, there are many instances of foraging societies becoming more sedentary, and of foraging societies becoming less sedentary, in either case without developing any involvement with agriculture; and there are other examples of similar trajectories 'into' and 'out of' sedentism that coincided with an involvement with plant and/or animal husbandry. Many 'early agricultural' societies in fact combined foraging and herding, or foraging and small-scale horticulture, or mixtures of all

three, and were mobile, in some cases (as in parts of northwest Europe) much more so than when they had been 'pure' foragers.

Belinda Zeder theorizes (29) that rather than being forced to settle down and focus on less desirable resources, it seems more likely that people took advantage of newly abundant high-yield plant resources and associated herbivores in ways that enabled them to increase the size and duration of community nucleation beyond that possible under Ice Age conditions. It is also possible that when people were faced with localized pressures on resources resulting from more sedentary ways of living, an interest in preserving the bonds of community provided an important incentive for the development of strategies that helped promote the yield and predictability of these resources. Moreover, these same social considerations also probably helped guide the subsequent responses to regionwide pressures caused by the climatic squeeze of the Younger Dryas and the stabilization of climate that followed.

As the debate shifted increasingly to the character of late foraging societies prior to the emergence of farming, and to ideas that some of them might have been developing forms of social behavior akin to those assumed to be typical of early farmers, there was an increasing concern to refine definitions and sharpen the focus on the characteristics of domestication and agriculture: were we trying to understand one process, or several kinds? David Rindos (63) for example, proposed a three-stage evolutionary sequence of plant domestication. 'Incidental domestication' occurred when people removed a species from its native habitat and created conditions in which they became an effective, though not the only, agent of dispersal. 'Specialized domestication' would have developed as people began to depend on wild species and consciously to propagate them; he suggested that this would be the stage at which we might expect to find morphological changes starting to take place, if the plant was having to adapt to attract the human agent and permit successful dispersal by humans. 'Agricultural domestication' was when behaviors developed which completely transformed the relations with the plant by controlling its ecology and evolution: behaviors such as tilling and weeding the ground to remove competitors, and selecting seeds for sowing and for storage after harvest.



Jacques Cauvin - Neolithic: a Reviolution of Symbols, not a revolution of economic arrangements

Lately, Jacques Cauvin (64) offered an ambitious interpretation of the Neolithic revolution, which he views as a "revolution of symbols," not a revolution of economic arrangements. He feels that there isn't enough evidence to support such approaches as Binford's packing model, but he does see value in Braidwood's argument that domestication and agriculture didn't happen until culture was ready to receive it. To Cauvin, the Neolithic represents a fundamental transformation of world views that took place before the emergence of agricultural economies in the Near East. The primary symbols are the Goddess and the Bull, which represent the cultural creation of the divine and a fundamental symbolic transformation of the pre-Neolithic world. Cauvin's claim that the birth of the gods created a sense of self and, in turn, promoted the development of human agency and agriculture is reflected in his book's title, *The Birth of the Gods and the Origins of Agriculture.*
This profound and irreversible transformation in the way that humans saw themselves in relation to nature, codified in religious ideology, found expression in concrete ways: in art, household and community structure, and the domestication of plants and animals. A similar notion can be found in Hodder's (65) emphasis on the role of symbols and metaphors of human dominance over nature made concrete in the form of the house, as the *domus* of domestication and the crucible of community.

Even though Cauvin asserts that domestication was the product of both cultural and natural factors, he devotes considerable attention to arguing against the possible role played by natural and some

cultural factors, which, as Hodder notes, leaves him "backed into the corner of arguing for a causal and chronological primacy for the psychocultural." Regrettably, Cauvin doesn't devote enough attention to explaining why these symbols were created, what caused them, and why they became particularly powerful during the Neolithic.

Most of these hypotheses have been vague, even mystical, about what constitutes social demand and they have not explained why this demand was peculiar to the regions that became the primary agricultural hearths. The exception is Hayden (62), who specifies which social activities and features would constitute social demand and what their ecological correlates would be. From his discussion, he derives five testable expectations: (1) domestication will arise in rich environments; (2) it will appear in societies with status inequalities; (3) these societies will often hold feasts, especially in a competitive context; (4) the domesticated species will be suitable for feasting and be classifiable as intoxicants, delicacies, prestige items, or "dietarily deficient types of food"; and (5) resource stress, population pressure, and malnutrition should not be an apparent precondition.

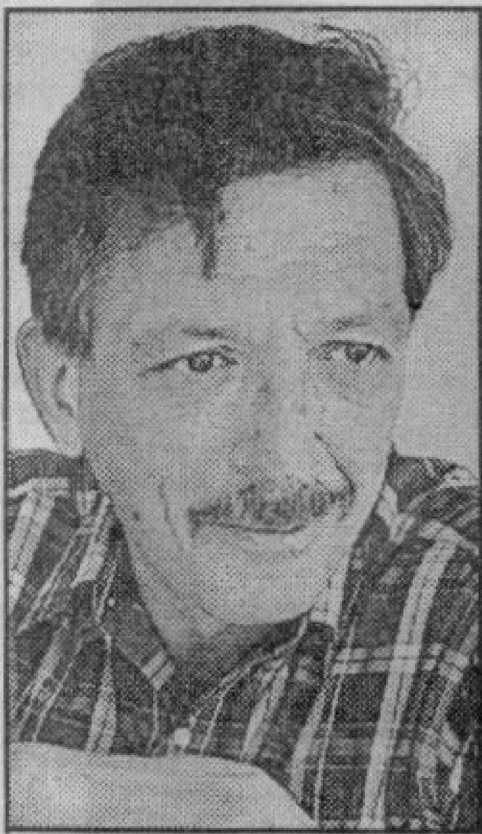
Cultural approaches to explain the origins of domestication and agriculture assume an active role for human agency and tend to discount, if not deny completely, the importance of natural or environmental factors. In these approaches, cultural changes, such as a transformation of the human relationship with the divine or of the conceptualization of self, can be enough in some cases to account for the changes we see in the archaeological record. The main drawback with these hypotheses is that sometimes it's not immediately clear why such transformations would occur. Such answers as Braidwood's "when culture was ready" were unacceptable even in 1960, and they're no less so now. These approaches envision the development of agriculture as something humans achieved through cultural means, and not necessarily from a lack of alternatives.

These approaches, like the ones reviewed before, are also not immune to extreme positions. Just as we can identify some environmental approaches as teetering on the brink of determinism, we can find some cultural and cognitive approaches that seek to emphasize the role of human culture to the near, or certain, exclusion of noncultural factors. In these approaches, such natural phenomena as climatic changes are either irrelevant to the explanation of cultural outcomes or were consciously exploited by people to further cultural objectives, so they weren't merely phenomena to which people reacted.

While there are some who proclaim that population growth and climatic change alone are impossible to indict as immediate and direct causes of change, there are others, such as Kujit (68), who straightaway deny any relationship between social developments and domestication, either as a cause or a consequence. He bases this conclusion on the fact that morphologically altered domesticates appear in the archeological record of the Levant several thousand years after the first signs of leveling mechanisms for promoting social cohesion in the Natufian and at least a thousand years before their ultimate collapse and the emergence of social inequality in the Late Pre-Pottery Neolithic.

Some Other Theories: In addition to the above mentioned hypotheses accounting for the origins or causation of agriculture, there are several others which have been proposed; some of them routinely mentioned in literature as possible alternatives. One such theory calls for domestication for

religious reasons. About 1900, Eduard Hahn proposed a theory that some animals might have been first domesticated out of religious



SACKED: Dr David Rindos.

concern rather than for economic reasons. He chose the urus (*Bos taurus*), a form of wild cattle, as his model, but the idea was extended to other animals and tentatively to plants. The idea has not dominated anthropological thinking but continues to be revived from time to time and

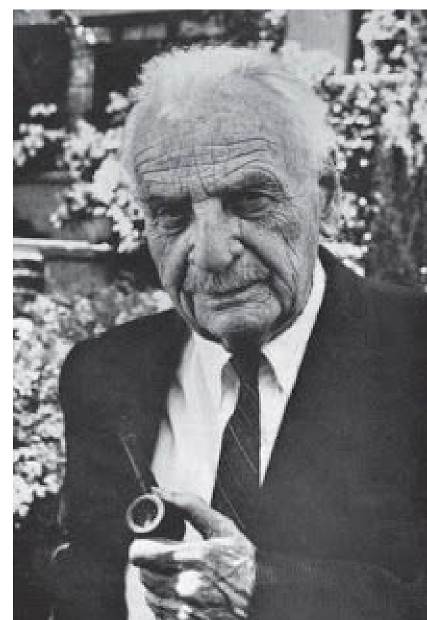
David Rondos: appears in current andenying human intentionality thropological and geographical literature. The possibilities are intriguing and the theory should be considered on its merits. Inthe1980s,contributionsincreasingly

stressed the continuities rather than the contrasts between foraging and farming. Concepts such as 'human–plant symbiosis' and 'people–plant interaction' were introduced. These imply an unintentional process by which human intervention, selection and replanting (i.e. environmental manipulation) eventually gave rise to strains of plants and animals that depended upon human assistance for their survival and upon which humans in turn depended sustenance. These theories did not address the question of what motivated human societies to shift primary dependence from wild foods to cultivated ones but merely emphasized the Darwinist view that the path to agriculture could have been an evolutionary process (4). David Rindos denied human intentionality in this process, seeing it as an outcome of natural evolutionary process: "People could not intentionally domesticate a crop. Hoverer, they would, and surely did, favor those individual plants that were most pleasing or useful to them" (4). This downplaying of human intentions would not today be accepted by many archaeologists, but the perspective that humans were adapting to plants and animals as much as plants and animals were adapting to humans gives an additional insight into the domestication process. Harris (138) , more or els, followed the same evolutionary logic but stressed that the relationship between the energy input into food procurement and the output per unit of area of exploited land, a

positive value determining the direction of evolution.

Another proposal, going quite a long way in the past to Darwin, proposes the origins of agriculture simply as a discovery. “The savage inhabitants of each land, having found out by many and hard trials what plants were useful, or could be rendered useful by various cooking processes, would after a time take the first step in cultivation by planting them near their usual abodes...The next step in cultivation, and this would require but little forethought, would be to sow the seeds of useful plants; and as the soil near the hovels of natives would often be in some degree manured, improved varieties would sooner or later arise. Or a wild and unusually good variety of a native plant might attract the attention of some wise old savage; and he would transplant it, or sow its seed” and “ Nomadic habits, whether over wide plains, or through the dense forests of the tropics, or along the shores of the sea, have in every case been highly detrimental (to "progress"). Whilst observing the barbarous inhabitants of Tierra del Fuego, it struck me that the possession of some property, a fixed abode, and the union of many families under a chief, were the indispensable requisites for civilization. Such habits almost necessitate the cultivation of the ground; and the first steps in cultivation would probably result, as I have shown elsewhere (above), from some such accident as the seeds of a fruit tree falling on a heap of refuse, and producing an unusually fine variety”. Darwin concluded, however, that "the problem, of the first advance of savages towards civilization is at present much too difficult to be solved" (123).

One of the most influential theory was that of Carl O. Sauer, mentioned earlier, a geographer whose *Agricultural Origins and Dispersals* has become a classic. He combined the Darwinian views with Eduard Hahn's idea (1909) that vegetative propagation should precede seed agriculture, and


Carl Sauer

set out to locate the cradle of agriculture on theoretical grounds in the tropicals. According to this thinking, agriculture did not originate from a growing or chronic shortage of food. People living in the shadow of famine do not have the means or time to undertake the slow and leisurely steps out of which a better and different food supply is to develop in a somewhat distant future.The hearths of domestication are to be sought in areas of marked diversity of plants and animals. This implies well-diversified terrain and perhaps also variety of climate. Primitive cultivators could not establish themselves in large river valleys subject to lengthy floods and requiring protective dams, drainage, or irrigation. Thus, agriculture began in wooded lands. Primitive cultivators could readily open

spaces for planting by deadening trees; they could not dig in sod or eradicate vigorous stoloniferous grasses. The inventors of agriculture had previously acquired special skills in other directions that predisposed them to agricultural experiments. Above all, the founders of agriculture were sedentary folk. So the theory, in essence, goes. (70) .

EdgarAndersonlikedSauer'sviewand added some genetic threads to the fabric. He saw weeds as potential domesticates; he also thought that an increase in hybridization, with disturbed habitats, could result in increased variation and new genetic combinations from which useful selections could be made: “Rivers are weed breeders; so is man, and many of the plants which follow us about have the look of belonging originally on gravel bars or mud-banks. If we now reconsider the kitchen maddens of our sedentary fisherfolk, it seems that they would be a natural place where some of the aggressive plants from the riverbanks might find a home, where seeds and fruits brought back from up the hill or down the river might sometimes sprout and to which even more rarely would be brought seeds from across the lake or from another island. Species which had never intermingled might do so there, and the open habitat of the rubbish-heap would be a more likely niche in which strange new mongrels could survive than any which had been there before man came along” (124). Like Sauer, Anderson also felt that agriculture began in the tropics on dump heaps and that vegetative propagation predominated at the beginning, but he also left open the question of early transoceanic contact.

Evidence accumulated since the SauerAnderson models were suggested has indicated that some of their presuppositions were incorrect. For example, sedentary life is not essential to the evolution of agriculture. In Mesoamerica there is good archaeological evidence that the people remained nomadic long after they were purposely growing plants for food. In the Near East, there is evidence that a nuclear center developed in an area not in the tropics and by people not necessarily dependent upon aquatic resources. In that region, the people most dependent upon fishing and fowling, the Natufians, were among the last to take up agriculture. Thus, although the Sauer-Anderson models have been widely accepted by many, they are open to question.

In the 1990s, economic growth theorists began to examine the historical transition from stagnant productivity to sustained economic growth that seems to have occurred with the Industrial Revolution. Inquiry into the pre-industrial economy led some scholars to suggest that the rise of Neolithic agriculture had a crucial influence on later economic development. Since then, a small but growing number of articles have deat specifically with the emergence of farming. Smith (143)) examines the hypothesis that the extinction of large herding animals by Paleolithic hunters led to the rise of agriculture. North and Thomas (144).) argue that population pressure, together with the shift from common to communal property rights, spurred on the development and application of cultivation and domestication techniques. Locay (145) studies the implica

While observing the barbarous inhabitants of Tierra del Fuego, it struck me that the possession of some property, a fixed abode, and the union of many families under a chief, were the indispensable requisites for civilization. Such habits almost necessitate the cultivation of the ground; and the first steps would probably result from some such accident as the seeds of a fruit tree falling on a heap of refuse, and producing some unusually fine variety. The problem, however, of the first advance of savages toward civilization is at present much too difficult to be solved (*Charles Darwin Descent of Man 1874*).

tions of nomadic versus sedentary lifestyles vis-a`vis the rise of agriculture. Morand (146)) has

presented a model that discusses the family's resource-allocation behavior in relation to the shift to farming. Olsson (147), in a framework that manages to compare a number of archaeological explanations, finds support for the theory that environmental factors, along with genetic changes in the species suitable for domestication, paved the way for agriculture, while Weisdorf (63) argues that the emergence of non-food specialists played a crucial role in the transition to farming.

Sometime ago, Jack Harlan (70) had suggested that human beings were enormously varied and their motivations were always complex and never simple. It is difficult enough to psychoanalyze a living, speaking human, so how can we expect to

*Approaches to the Origins of Agriculture*analyze people who lived 10,000 year ago and who

belonged to cultures we can but dimly imagine? ronmental change or population pressure, the latter 37often seen as the inevitable outcome of sedentism. 'Pull' models were those that suggested that, when

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Concluding Remarks: The prehistoric transisocial strategies will undoubtedly have played a part''' ·iii tion to agriculture poses one of the most interesting in individual cases at the local scale (73).agricultural systems " ''' '''questions in archaeology and one of the most diffi

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Three basic models for the origins of agriculture , proposed by Barba Stark (*adopted from Peter Bogucki, The Origins of Human Society, 2000***)**

the origins of agriculture in the New World, Barbara Stark identified three main types of models for the origin and spread of agriculture - 'push', 'pull', and 'social' - which are an apt summarization of the theories so far discussed. 'Push' models were the kind of theories like those of Binford, Flannery, and Cohen, which proposed that people were propelled into farming by some kind of stress, such as enviplants and animals, Why did the huntergatherers give up a way of life that had been successful for tens of thousands of years? What caused them to become reliant on domesticated animals and plants for their food? These are different aspects of the same question, namely: why did humans become farmers? or, simply, Why agriculture? In this review we attempted to answer this question. As is apparent from the above, however, the answer to this question is not as straightforward as it might appear.

As is evident from the discussion in this chapter and the one preceding it**,** there are, no easy answers to central questions about domestication and agricultural origins. It is no wonder that for more than 100 years this area of inquiry has held the attention of archeologists working worldwide and representing all of archeology's many and rapidly increasing subdisciplines. It is a research domain that carries broad currency with scholars based in biological and physical sciences, social sciences, and humanities. It is a topic that captures the imagination of a public interested in how the familiar world around them came to be. It

is a problem that truly matters. With an enhanced understanding of the nature of the problem and an expanding array of powerful tools for studying it, there has never been a time of greater promise for pursuing challenging questions about the origin and diffusion of domesticates and agricultural economies in virtually all areas of the globe.
The development of the commitment to farming by prehistoric foragers has most commonly been explained by changes in food supply linked variously to environmental change (whether naturally or humanly induced), population growth, sedentism, increasingly competitive social relations, or changing ideologies. Given present understanding it is tempting, as many scholars have done in recent years, to put a little bit of everything into the pot, along the lines of: 'first, take your suitable resource zones; add some diet breadth, including a good sprinkling of long-utilized species well suited to being domesticated; spice with a little sedentism and population growth; stir well with social competition and new identities and ideologies; and bring to the boil with a little climatic change.' However, as Bruce Smith (120) concluded at the end of his own perceptive review, 'it is important not to carry the search for similarities too far, or to invest it with too much explanatory authority. The danger is that in rendering down long and complex developmental histories of different regions into a simple set of shared characteristics, we may lose sight of the rich diversity that exists between the various centers of origin' (120). In this chapter, too, we have endeavored to bring out the extraordinary diversity of the evidence, and its geographical and chronological scale, rather than argue for a simple thesis that, however deceptively attractive, fails to acknowledge that diversity. In particular we have tried to demonstrate that such diversity is poorly served by simplistic notions of 'experiment', 'invention', 'migration', 'dispersal', 'acculturation', and so on, however seductive and

pleasingly straightforward such schemes might seem. This diversity sits uncomfortably with any attempt to build a grand crosscontinental theory of universal applicability for why foragers became farmers. At the same time, however, there are cross-regional similarities and common themes that are not adequately served by simply privileging historical contingency, the uniqueness of each time and place, and the freedom of all the individual human actors involved (7). As Steve Mithen commented at the end of *After the Ice,* his monumental global human history from 20,000 BC to 5000 BC: 'while the history of each continent was unique ... some forces of historical change were common to all. Global warming was one. Human population growth was another ... [requiring] new forms of society and economy irrespective of environmental change. A third common factor was species identity' (122).

Archaeologists' ideas about why foragers became farmers have changed repeatedly since the confident pronouncements of the Victorians. The changing debate described in this chapter can perhaps be caricatured as having progressed through the following major perspectives (7):
(i) the advantages of farming were obvious, it just

needed time for people to see them as the next rung on their Ladder of Progress;

(ii) the advantages were obvious, it just needed Holocene environmental change to concentrate foragers' minds;

(iii) the disadvantages were obvious, foragers only became farmers when the choice was either to become farmers or to starve;

(iv) foragers were well on the road to becoming farmers in the late Pleistocene, so it just needed the stimulus of Holocene environmental change;

(v) foragers found they were becoming farmers despite themselves because of how they reacted to Holocene environmental change, with no going back;

(vi) foragers could see there were few advantages in farming, and successfully resisted for a long time;

(vii) foragers (or rather a few ambitious individual foragers) could see that there were advantages in having more food, or strange exotic foods, for maintaining and enhancing status;

(viii) foragers' culture had already moved from being part of the wild to controlling the wild, so it was just 'one small symbolic step' to fencing some of it off.

We have seen that these changing theoretical perspectives on the origins of agriculture have been part and parcel of wider theoretical developments within archaeology: from Victorian theories of stages of human development, to Childe's concept of the primacy of the Near Eastern prehistoric culture, to the Processualists' concerns with systemic change and the dominance of economic decision-making, to the Post-Processualists' focus on structure and agency (the roles of individual 'actors'). Nevertheless, in this, as in other areas of archaeological inquiry, the thrust of mainstream research has not developed absolutely hand in hand with theoretical shifts: many of the ideas about why prehistoric foragers became farmers that were first expounded by archaeologists 100, 50, 20, or ten years ago still provide the dominant theoretical frameworks of the global community of archaeologists and scholars in related disciplines working on the problem today. Some of these

should have passed their 'sell-by date' some time ago, but others continue to stimulate effective research even though they may not sit comfortably with the most recent theoretical discussions. Overall, the development of theoretical frameworks in relation to the origins of agriculture has probably been shaped most of all by archaeologists' changing awareness of the complexity of forager and farmer decisionmaking. Having said that, one of the most surprising aspects of the history of the debate has been how often sophisticated arguments have continued to be structured implicitly around a notion of an inevitable progression (and indeed progress) from foraging to farming as an unstoppable one-way historical process, Westropp's Stages of Development of Man by another name (7).

Whilst changing theoretical perspectives have been affected by new discoveries and new techniques, it is noteworthy how, in many regions of the world, they have been able to thrive without the inconvenience of being tested by significant new data! In South-West Asia, for example, the political instability of the region has meant that in many parts of it very little new data have been produced by fieldwork from the early 1970s onwards, so that excavations of one or two new sites, like Abu Hureyra, became the focus for exhaustive interpretation and reinterpretation. Research in Mesoamerica and South America has often been affected by political instabilities in much the same way. Archaeological fieldwork in Africa over the past four decades has also been extremely patchy, extensive in some regions and entirely absent from others, because of armed conflicts and political unrest, and of course the same situation applied in mainland South-East Asia during the Vietnam war and its aftermath. Little work by Chinese archaeologists was known to outside scholarship through the 1960s and 1970s, the Cultural Revolution put an effective stop to Chinese academic research, and it was not until well afterwards that field investigations were resumed by Chinese archaeologists and their collaborators. Archaeology in India is plagued with a frenzy of ultra-nationalism and ‘India first’ syndrome. In Pakistan, the field has become fallow, in fact barren, since the interest of the West has vaned due to security concerns.

Nevertheless, along with the changing theoretical debates summarized in this chapter, over the past 15-20 years there *has* been relevant new fieldwork in some major regions of the world, augmented by the results of dramatic advances in archaeological science and other disciplines such as molecular genetics. The combination of new theories and new data has transformed our understanding of the nature of forager-farmer transitions - what happened, when, how, and above all, why? If we do not have any clear answers yet, it should not deter us from informed speculation.

We have moved from a position where the attention of geneticists was focussed on a simplistic model for agricultural origins to one where genetics and archaeobotany are combining to understand the evolutionary events that led to the emergence of domesticated crops. These studies are not just arcane investigations into past events. In many respects, the domestication process did not end 10,000 or 12,000 years ago. Crops have undergone continual evolutionary change resulting in their gradual improvement as nutritional resources.

The development of agriculture around the globe entailed innumerable historically contingent decisions by individuals and communities confronted by what they perceived as risks and opportunities. But they took those decisions, of course, without knowing the likely outcome. It is important that we do not fall into the trap of evaluating those decisions with the benefit of hindsight - a tendency that has characterized so much thinking about the reasons for the agricultural revolution. As Diamond (6) warns, 'what actually happened was not a *discovery* of food production, nor an

invention ... food production *evolved* as a by-product of decisions made without awareness of their consequences'. We should, therefore, view the first attempts by humans to manage their wild plant resources as the initial step on a lengthy and unbroken path that continues today with our scientifically informed programs of crop improvement. Our efforts will be more dependent in the future on accessing natural sources of biodiversity that harbor mutations that have been selected over evolutionary time for adaptation to new environments. An understanding of the genetic events occurring during domestication will therefore help us design knowledge-based breeding programs that will enable the full genetic potential of the wild and cultivated gene pools to be harnessed for the benefit of society.

The archaeological record of forager-farmer transitions must embody many unwise and foolish decisions, including fatal miscalculations, not just successes. Too often, debates about the transition from foraging to farming are still characterized by an evolutionary approach to the past that, though more subtly expressed, is not so very different from the Victorian notions of ladders of cultural progress with which we began this chapter: that those prehistoric foragers who intensified their subsistence in ways that we can recognize would in time become food production were doing so because (implicit in the reasoning though never so crudely expressed) they half-knew they were on the road to the eminently desirable goal of becoming farmers. In fact, as the regional case studies have shown, it seems more likely that in many instances foragers were attempting to *preserve* their way of life at a time of stress, rather than deliberately seeking to *transform* it.

The transition from foraging to farming was the most profound revolution in human history, albeit one whose origins in many respects may go back to the beginnings of our species and whose aftershocks have continued in some parts of the world almost to the modern era. Its legacy today is the mechanized and industrialized systems of farming that sustain extraordinary densities of population and a global economy that together threaten the sustainability of our planet on a scale unmatched at any time in the past. It was indeed a revolution, but one that was as much about human imagination and psychology as economic and social behavior (7).

Given an array of evidence, spread all over the world, Graeme Barker (7) concludes that modern humans in the Pleistocene, in every kind of environment, demonstrated a tendency of surprisingly 'interventionist' relationships to the landscapes they inhabited that in one form or another presaged the later relationships that we recognize as agriculture. Secondly, commonly started to engage in different kinds of animal and/or plant husbandry at or soon after the transition to the probably many more societies than envisaged, in all parts of the world, Holocene - in South-West Asia, Iran and Baluchistan, East Asia, Island South-East Asia, several parts of the Americas, and North Africa (and who knows when in tropical West Africa?). Independent of one another (at the regional scale, that is), and in many different ways, very many societies arrived at solutions to living in the transformed landscapes they were encountering which we can recognize as the beginnings of systematic husbandry and agriculture.

The scale and universality of these two phenomena must not be exaggerated, however. For example, it is surely significant that, however 'environmentally interventionist' some Pleistocene foragers were, there is no trace of the transformed world - views represented by Neolithic theism in Paleolithic culture, and much evidence for the continuation of animistic relations to nature, most obviously in cave art and artifact decoration. Within all the regions mentioned above, many societies arrived at very different solutions to living with the early Holocene that did not involve husbandry, just as they

did in Europe until they started to encounter and make use of the Eurasian domesticates. At the Pleistocene-Holocene boundary the really critical factor in the emergence of farming was the same human intellect that in the previous 40,000-50,000 years had taken modern human foragers throughout most of the world: “People shared the same biological drives and the means to achieve them - a mix of cooperation and competition, sharing and selfishness, virtue and violence. All possessed a peculiar type of mind, one with insatiable curiosity and new-found creativity. Without it, there would have been no human history but merely a continuous cycle of the adaptation and readaptation to environmental change that had begun several million years ago when our genus first evolved. Instead, all of these factors [global warming, population rise, human creativity] combined, engaging with each continent's unique conditions and a succession of historical contingencies and events” (122).

As is evident from the above, increasing sophistication in approaches to defining and documenting domestication make it ever more difficult to support explanatory frameworks based on any single forcing factor. This is particularly true for the Near East, where we have, arguably, the most complete record of the initial domestication of many plant and animal species. Thus, the story of domestication and agricultural origins consists of a series of complex regional puzzles shaped in unique ways by a dynamic multi-scalar range of macro- and micro-forces. Attempts at explanation that champion any one of these factors and deny the importance of others will not, in the long run, contribute to understanding agricultural origins either as a general process or as it played out in particular instances.

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SECTION IV

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Spread of Agriculture in Pakistan and the Borderlands!

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IV.0. The Spread of Agriculture in Pakistan and the Borderlands



It has been emphasized throughout the last two Sections that food production, that is, agriculture and animal herding, markedly differs from hunting-gathering way of life. While the latter depends on whatever Nature chooses to produce, the former is a process of creating favorable conditions (seed, soil, water, fertilizer, etc) so that Nature produces what the grower teases it to produce, and produce it in abundance. This, by itself, may not be a fundamental difference because most of these criteria could be viewed as a matter of degree and not necessarily a matter of kind. But, combined with other characteristics of the time, such as sedentary living, food storage, social stratification, and the like, subsistence economy of agriculture and pastoralism becomes fundamentally different from food gathering and hunting. Furthermore, this cultural and technological change may not be a sudden occurrence in the history of mankind although it was fast enough to be termed as a ‘revolution’. At the end, the mastery of agriculture and management of domesticated animals was indeed one of the great revolutions in human history.

The potency and vigor inherent in food production through domesticated plants and animals were critical in sustaining the large populations implied by settled life and growth of towns and cities. These parallel developments led to the development of predominantly agricultural centers in several different parts of the world and gave birth to even larger number of predominantly pastoral societies that dotted these regions. The beginning of settled life and the symbiosis between settled peoples and pastoral nomads, so important in several regions, begins here and Pakistan seems to be playing a prominent role in this melodrama of prehistory.

There are a number of ongoing debates among archaeologists on the question of the beginnings of

agricultural in Baluchistan and its spread to the Greater Indus Valley generally. Is Baluchistan and Western Sindh an original 'hearth of domestication' (i.e., where the plants and animals were domesticated from local flora and fauna)? If not, then where did the domesticated plants and animals come from? Was the Greater Indus Valley a 'peripheral' area to a 'core' or 'nuclear zone', such as the Levant, or the Near East in general? Or, alternatively, was it neither the peripheral nor the core area but an integral component of a wider area, the 'expanded nuclear zone', that can be specified as the 'hearth of domestication'? Can we pinpoint when specific plants and animals made their first appearance in this land? Did the appearance of crops occurred all at once or over a period of time? What types of social and economic changes occurred as people adopted agriculture and animal husbandry as their primary subsistence regime? How agriculture and pastoralism developed as a predominant means of subsistence and what was its mechanism of spread within the Greater Indus Valley? How the practice of food production, as opposed to food gathering, spread beyond the Indus Valley to India across the Thar? How does one explain such a long time lag between Pakistan and the Peninsular India? In this section we try to find the answers to some of these questions.

This section has six purposes. The first is to review the current evidence for early agriculture in the Greater Indus Valley and the region to its west, more specifically in Iran, Afghanistan, Central Asia, and the Fertile Crescent. The second is to explore the implications of the adoption of domesticates to the development of a sedentary village life in Baluchistan and its spread throughout Pakistan. For this we may turn to the site of Mehrgarh in brief, leaving the details to the next Section. The third is to discuss the diverse opinions to answer the questions as to how domesticated plants and animals migrated from region to region and see if there is a general pattern to this migration and spread. The Fourth is to critically examine the conventional wisdom that leads us to the Levant in our search for our first domesticates on which the agriculture and pastoralism of ancient Pakistan were based. Our fifth aim is to see if an alternative paradigm can be offered to explain the early domestication of plants and animals in Baluchistan without invoking the migration of seed-bearing farmers from the Near East or western Iran to the Indus Valley or diffusion of the 'idea' of agriculture from whatever source. Finally, our sixth purpose is to look eastward and see how the peninsular India finally caught up with the Neolithic Revolution that was spreading all around this region and what role the Indus Valley played in this crucial transformation.

Perennial questions in the archaeology of Eurasia are whether agricultural and pastoral origins were single or multi-centered phenomena and whether the spread of subsistence practices based on domestic taxa over discrete but vast areas reflects indigenous adoptions, colonizations, or both. The queries as posed here are stark and simplistic and some might argue, meaningless in context of Pakistan. Yet the same scholars and their more sophisticated cousins continue to generate much discussion and elaborate research in the Near East and Europe.

The main theme of this Section is the early stages of the development of agriculture and animal keeping in Pakistan. It revolves around the establishment of largely food-producing communities of noticeable size which are first detected in the archaeological record of the Near East and immediately after in Baluchistan and western Sindh in Pakistan. It goes on to deal with the spread of food producing settlements in Central Asia, the dates of which are somewhat later than those of the Kachi plain, about a millennia, give or take a century or two. The focus then shifts to the interior of the country and beyond. In so doing, it examines the circumstances under which the early agricultural settlements and the food producing cultures from the Kachi plains spread over the surrounding areas, especially to Sindh, Punjab, the Derajaat, and then to Gujarat and the Divide in the present-day India.

The focus of attention in this Section is the time span between about 8000 BC and 3000 BC and Mehrgarh figures prominently in this discussion.

To explore the origins of agriculture and the development of first neolithic settlements in Pakistan is central to this Section. Here we heavily depend of the archaeological findings in the Kachi plains on the border of Sindh and Baluchistan. As we meet the early neolithic Indus man in this area, he is found to already engage in cultivating and living in fixed villages but we do not have any knowledge of him transiting from a hunter-gatherers life to a sedentary agricultural way of living, as we do, for example, at a number of sites in the Near East. Obviously, we have an evidentiary gap for this important cultural transition in the story of humans in the early Holocene in this part of the world. We fill this gap with a cautious and informed speculation based on what we have learnt in the Near East. This is why a study of the beginning and spread of agricultural and pastoralism becomes important. The archaeological record of South-West Asia are much more robust and the idea that the domestication of plants and animals may have first originated in this area from where it spread to the entire Iranian Plateau, including Baluchistan, may not be far-fetched. As we look to the west for a possible origin of agriculture and animal domestication, we look to the East for the belated diffusion of the neolithic culture into India, especially through Gujarat in the SouthEast and the Divide in the North-East of Pakistan. Of course, as we review the spread of the neolithic culture in Pakistan, we are also interested in the neighboring regions of Iran, Central Asia, and Afghanistan, to see what was happening there at the time.

We do not know precisely how long it took for specific crops and animals to become subsistence staples in any given region of Pakistan. The process may have been short in some cases, long in others, but when viewed at the scale of the whole country within a perspective of the past 10,000 years, the results of each transformation can be seen to have been nothing less than revolutionary. The latter sections of the book will deal with the transformation of these elementary settlements into village farming communities, mature agricultural villages, strategically located trading centers, and finally into small towns that in many ways mimicked the coming grand urban centers of the Harappan Civilization.

What follows is a reasonably complete presentation of the spread of agriculture in context with West Asia and South Asia rather than a streamlined version of the origins and spread of agriculture and herding within Pakistan alone. There are other aspects of the story and these are as important: the emergence of permanent settlements, the appearance of pottery, and the technological developments related to agricultural and household implements. But, some of these issues have already been discussed in the previous sections or will be taken up elsewhere as we proceed. Here, we want to keep our focus rather sharp. We shall be distracted by one important issue, though: was the Near East really the ‘core area’ of all inventions or was it not merely a part the “expanded core-area”, that included Iran, Central Asia and the Greater Indus Valley? All this is an extremely interesting prospect. This subject has not been given proper attention in archaeological literature so far; the last chapter of this Section tries to address this sensitive issue.

In spite of the possibility of locating interesting studies on a range of questions that concern us here, only limited archaeological data are available from the Greater Indus Valley: the intensity of research has been simply not of the same level as is noticed in the Near East. Within Pakistan, a healthy level of bioarchaeological research has been carried out in the recent past but it is of uneven quality. An additional complication is that the dating of some of the key sites is unsure or debated. The situation

in India is somewhat better in terms of the volume of research but it is largely advocative in nature - the researchers being more interested in one-up-manship than in impartial conclusion. Vishnu-Mittre (1) and Cajole (2) have reviewed the archaeobotanical evidence up to the end of the 1980s but Sir Joseph Hutchinson's 1975 summary (3) of what was known about the character of early South Asian plant and animal husbandry still stands, although the question of origins is now somewhat less "obscure" than it was two decades ago. Steve Weber wrote several summaries related to the development of seed agriculture in the Indus Valley in the later part of the Indus Age and in 2003 came up with an edited book, *Indus Ethnobiology* (4). A slew of recent publications by Dorian Fuller is especially useful for addressing the spread of agriculture in India. Gregory L. Possehl has eminently addressed some of the issues related to the beginnings of agriculture in the Indus Valley in his monumental book, *Indus Age - The Beginnings* (5). But the greatest contribution to the beginning of animal domestication and spread of seed agriculture in Pakistan is from Richard H. Meadow (6-14) and Lorenzo Constantini (15-17). Of course, there are several other publications that touch upon the subject of this Section and they are as important. We shall refer to them as we proceed.

What we have currently for South Asia in general is a patchy archaeological framework with little depth of understanding of any single region, let alone for the entire area. The study of plant and animal remains continues to be rather haphazard and the results are only now beginning to be integrated into the broader archaeological picture. Questions of archaeological provenance and sample integrity, particularly critical in archaeobotanical studies, are also just beginning to be addressed, as evidenced from Webber's timely collection of research articles mentioned above. The situation in eastern Iran, Afghanistan, and Central Asia is even worse. The research in these regions have been only marginal.

In spite of this dismal picture, our understanding of the origins and spread of agriculture and pastoralism in Pakistan has advanced considerably since the 1975 summary of Hutchinson. In particular, the sites of the North Kachi Plain (Mehrgarh, Nausharo, Sibri, Pirak) have provided a long sequence of plant and animal remains reaching back to nearly the beginnings of agriculture and animal husbandry in the region. In addition, many sites from across the vast expanse of Central Asia and to some extent from Afghanistan have been excavated or had material examined in an increasingly detailed and systematic fashion. We now accept that the mountains to the west and the northwest were not barriers to communication between the Greater Indus Valley and the areas to its west and that this ease in communication provided the means for the introduction of new plants, people and animals in each direction. In many ways our knowledge of the areas to the northwest of Pakistan is better than it is for eastern Iran, with the result that it is difficult to investigate the nature of exchange, infiltration, migration or colonization across the present-day borders or across the vast desert expanse that effectively separates Pakistan from Iran.

A related problem is that the first third of the Holocene is unknown archaeologically over vast areas of Middle Asia beyond the Near East, and thus peoples' interactions with local plants and animals are unknown in large parts of this area during this key formative period. The same applies to the general area that is now recognized as India. Here the dearth of evidence is not for any lack of research but purely for the absence of any evidence for agriculture and settled life till quite late in time, almost to the drawn of the Iron Age. We find, however, strong signs of nomadic pastoralism in the neighboring areas of Gujarat, Rajasthan and the Divide as early as the fourth millennium BC.

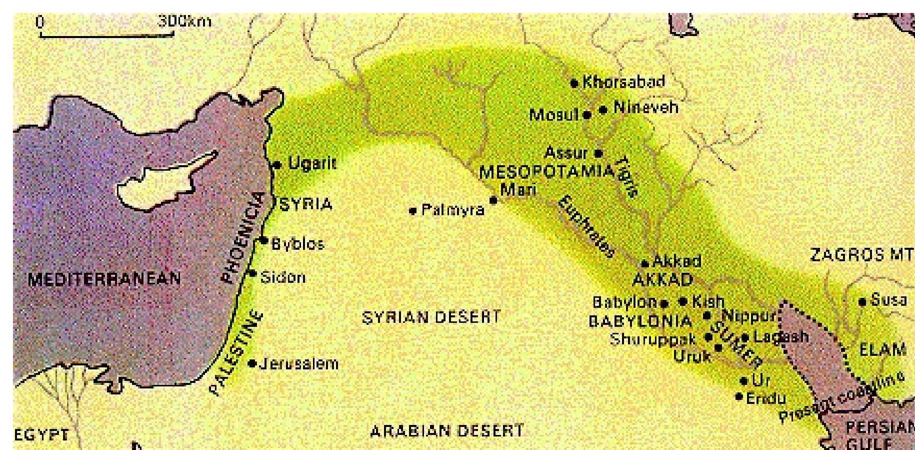
Given these uncertainties and some obvious gaps in our current knowledge about the early stages of

agriculture and pastoralism in Baluchistan and their later spread throughout the Greater Indus Valley, and given the absence of any evidence of such contemporary cultural developments in India, our fallback source for the support of our conjectures and speculations is the Near East where a tremendous amount of research work has been conducted and from where we mainly derive the knowledge about domestication of plants and animals by human mind. Thus, if the reader finds the chapter on the Near East rather lengthy, it is because of this relevance. The Near East is currently the earliest and best-documented area in the world where the fundamental transition from food procurement to food production is believed to have taken place and it deserves special attention

IV.1. The Beginning and Spread of Agriculture in South-West Asia

In the preceding chapters we dealt with a time of great transition in human history - a transition from food gathering to the first steps of food producing, a transition from mobile foraging to settled life. Taken together, it is nothing less than a cultural and technological revolution in the making. Unfortunately, we do not have much in the archaeology of Pakistan or any of the neighboring regions that could shed some light on this extremely significant transition in human culture. Fortunately, however, South-West Asia, especially the Levant, has been researched quite extensively and its archaeology opens up a wide window for us for looking into the late Paleolithic foratan were not any different from those of South-West Asia. This chapter partly addresses to this need.

This chapter is intentionally placed at the head of the chapters that follow. The reasons are three-fold: First, the South-West Asia, also referred to as the Near East, has been traditionally considered to be the place where agriculture, and possibly animal husbandry, 'originated' and from where it ostensibly spread to the West as well as to the East. Second, this is the area where most of the research has been undertaken, the result of which can be useful to other, less investigated, areas like South and Central Asia through comparison and contrast. Third and probably the most important in its geographical scope, the area is very similar to the fringe areas of the Iranian Plateau in Central Asia and Baluchistan. In this respect, there is no



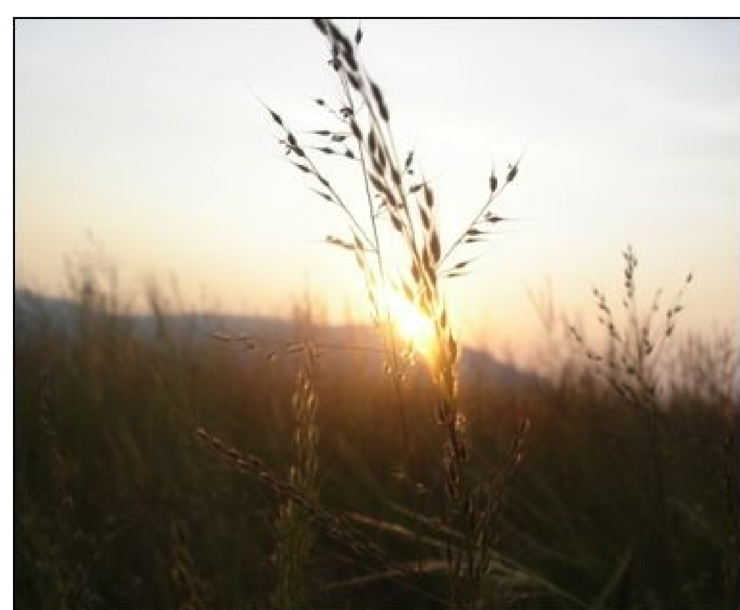
The map of the so-called "Fertile Crescent" and the areas of archaeological interest

gers turning into incipient agriculturists, the development of agriculture in this region, and its spread all around. From this research we may learn a great deal which can possibly be applicable to human condition in the Greater Indus Valley. After all, the geographical features, the environmental conditions and the food resources available in Baluchisclear ecological boundary between the Near East and the Greater Indus Valley or, for that matter, between the Near East and parts of Central Asia. Western Asiatic landforms - mountain ranges, alluvial valleys, semi-arid steppe, and deserts - extend

eastwards from the Iranian plateau beyond the Caspian Sea into Turkmenistan in Central Asia, and there are similar environments in Pakistan from Baluchistan to the Indus Valley. Rainfall is scarce all over and it mostly falls in winter. Thus, a study of the neolithic developments in the Near East could very well shed useful light on those in Central Asia, northern Afghanistan, and Baluchistan.

The Hearth of Domestication: The areas referred to above comprises the modern day states of Turkey, Iran, Iraq, Syria, Lebanon, Jordan, Israel, and Palestine. The territory along the eastern coast of the Mediterranean Sea is generally called the Levant and the region that now includes Israel and the western portion of Jordan is often referred to as Palestine.

Southwest Asia can be roughly divided into three major vegetation zones. The first is known as the mediterranean zone, extending in a narrow band along the eastern shore of the mediterranean sea and the southern and western coasts of turkey. The vegetation there consists of largely of evergreen trees, plants, sand shrubs - species that are not adapted to withstand cold temperatures. The second is the desert and desert-steppe zone, consisting of the deserts of Syria, Jordan and Iraq and the bordering steppe region including Mesopotamia
- the area around the lower reaches of the tigris



euphrates river system. Here the rainfall is low, plant cover is sparse, and the contrast between summer barrenness and early spring vegetation is striking. The third is the highland zone, which partly lies between the other two zones and partly surrounds them. The zone includes the Lebanon mountains of the Levant, the mountains of eastern turkey, and the Zagros mountains which extend the length of Iraq’s western border and into northern Iraq. To the west of this arc of mountains lies the Anatolian Plateau with an average altitude of 12370 meters (4,500 feet). The characteristic vegetation of this highland zone is temperate forest of oak, cedar, pine, pistachio and juniper. Edible fruits, nuts, and wild cereals abound, and sheep, goats, cattle, and pigs are found in large numbers.
Within these broad zones, there are considerable local variations in natural resources. In most areas, the rainfall is insufficient to support perennials, but rain is more plentiful in the uplands that sweep from the Levant to the Zagros mountains, which form the backbone of the so-called Fertile Crescent: the broad arc of territory curving from the head of the Persian Gulf around the northern edge of the Syrian desert to Palestine and the Egyptian border. The proximity of these zones to one another and the localized nature of certain resources encouraged the movement of people and the exchange of goods, and it is likely that farming became established in several places more or less the same time,

concentrating on the hills and grasslands that flank the arid Syrian steppe and on the southern Mesopotamian flood plans. Our principal focus is the classic zone of early farming, the socalled 'hilly flanks of the Fertile Crescent'.

The upland areas of the region mostly receive more than 200 millimeters of rainfall a year, which is thought to be the minimum required for growing cereals without irrigation. Rainfall decreases drastically moving out into the steppe and desert zones. The most forested parts of the region are the northern and southern coasts of Turkey, but lighter oak woodland is found throughout the Levant, Taurus, and Zagros mountains at median elevations, and in western Turkey. Steppe vegetation is found mainly in the central Anatolian plateau and to the south of the Taurus mountains in the upper Tigris and Euphrates valleys.

The best-explored area is undoubtedly the southern Levant - Israel, Palestine, and parts of Jordan. In other parts of Southwest Asia - Syria, Lebanon, Iraq, western Iran, the Gulf States, and most of Turkey, much less research has been invested and the surrounding areas, especially to its east, has been neglected altogether till recently. However, because we know very little about this region, we should not assume that it was unimportant in the history of mankind. As will be seen in the following page, these areas, especially eastern Iran, central Asia, Afghanistan and Baluchistan, were intimately connected with the Levant and were of utmost importance with regard to the origins and spread of agriculture. In this context, therefore, the archaeology of South-West Asia is as important for the study of the origins of agriculture in Baluchistsan and Central Asia as it is for that of Europe to its northwest.

As discussed earlier, the principal reason for the focus of so much field research looking for the origins of agriculture in this region has been the distribution here today, especially within the zone of oak woodland, of species of wild plants and animals assumed to be the ancestors or progenitors of the domestic plants and animals on which later farming both here and in adjacent regions has been based: in particular, wheat, barley, sheep, cattle, and goats. The wild cereals have been well researched in terms of their modern distributions and genetic affinities with modern and ancient crops, particularly by Harlan (18) and Zohary (19,20,21). The principal domestic cereals found on Neolithic sites in this region are einkorn and emmer, the so-called primitive wheats, and barley.

The Geographical Environmental Setting: Southwest Asia is a region of great geographical variety and climatic diversity. The natural habitats of wild wheat and barley, and wild legumes such as lentils, peas, and beans, which were the ancestors of the first cultivated crops, overlap one another to a large extent, as do the original habitats of the wild sheep, goats, pigs, and cattle that were hunted along with other species. In the 1940s and 1950s, pioneering field research by Robert Braidwood and a multi-disciplinary team defined what Braidwood called the "nuclear zone," an area where the hunter-gatherers who exploited these plants and animals lived. It was not in the alluvial plains of the so-called Fertile Crescent, the arc stretching from the Nile Valley in Egypt, up the Levantine coastlands, across northern Iraq, and down to the deltaic alluvium at the head of the Persian Gulf, where the great civilizations of Mesopotamia had flourished. Rather, Braidwood identified what he called the "hilly flanks of the Fertile Crescent" as the place where foragers first began to harvest, store, and process wild foods (22)**.**

During the Last Glacial Maximum *ca*. 20,000 years ago, atmospheric circulation belts were at lower latitudes than today. The prevailing winter storm path crossed South-West Asia from the Nile delta to

the Straits of Hormuz, whereas now it crosses northern Turkey and northern Iran. Beyond the Sinai, the climate of the entire region was extremely cold and dry. Most of the landscape consisted of steppe or desert-steppe, and woodland survived mainly in the uplands of the Mediterranean and Caspian Sea littorals and as isolated stands in the Zagros. Sea-level lowering meant that the Mediterranean coast was extended by some 10-15 kilometers from its present location, whilst much of the Jordan valley was covered by what has been termed the Lisan Lake.

The wild ancestors of the plants that were first domesticated, specifically the cereals and pulses, prefer a hilly habitat (as do the first herded animals, sheep and goats). These plants cope well with hot, dry summers, and flourish where there is more than 250 mm of mostly winter rainfall. Mobile hunter-gatherers could operate in the extensive semi-arid parts of Southwest Asia, but for farmers, the inter-annual variability around the 250-mm annual rainfall contour was much more dangerous. Semi-sedentary and sedentary hunter-gatherers were more like farmers than mobile foragers; relying on harvests of wild serials and legumes, they were subject to the same risks as farmers, and since they lived in larger groups in permanent or seasonal villages, they lacked the mobility and flexibility of the classic hunter-gatherers. The "hilly flank” environments were thus as suitable for them as for the plants and animals they ate.

During the harsher conditions of the Last Glacial Maximum *(ca.* 22,000-18,000 years ago), an open woodland zone of oak, *Pistachio* (a relative of pistachio tree), and wild almond was restricted to a small zone around the Gulf of Antalya in southern Turkey, and a strip behind the Mediterranean coast stretching from the “hilly flanks" zone. Such open oak woodland is also the habitat within which are to be found many grass species - wild wheat, barley, and rye and wild pulses. This is the environment wherein the first sedentary or semi-sedentary foragers in the Near East flourished and this is the region that has come under intense scrutiny by archaeologists and anthropologists alike.

The ice age did not depart quietly. The detailed climatic records now available from isotopic analysis of Greenland ice cores and the ocean cores from the Indus Delta in Pakistan demonstrate that the transition from the Pleistocene to the Holocene was not a single and sudden change from colder to warmer climate but a lengthy period of instability, characterized by profound and sudden temperature fluctuations. After about 15,000 years ago, there was a sudden dramatic warming in global temperatures, oscillated over the next two thousand years, but the general trend was downwards, back to cold and dry glacial conditions again. By *ca.*13,000 years ago or 11,000 BC, the temperatures had suddenly plummeted some 6-7 degrees celcius all over the region. This episode is termed the *Younger Dryas* stadial.

Neolithic Research in the Near East : The early beginnings of agriculture in the Near East, once called the ‘hearth of domestication’, have made Southwest Asia a special focus of interest to archaeologists seeking to understand the transition from mobile hunter-gatherer bands to sedentary farming villages. Since the 1950s, a series of archaeological expeditions have specifically sought evidence for the origins of domestication in the region stretching from the Zagros Mountains of Iraq through the Taurus foothills of southern Turkey down to the hills country and desert margins of the Levant. Coupled with environmental analysis, this work has focused on both the causes and the processes of the transition to sedentary living and food production. Moreover, the story that has been revealed is not merely one of environment and subsistence: remarkable carvings, sculptures, and wall paintings were produced by the human communities of this region during the crucial period, from *ca.*18,000 to 9000 BC (the late Pleistocene and early Holocene), allowing us to see this period as a

cultural revolution and perhaps of cognitive innovation, accompanying the shift from hunting and gathering to food production.

Two main groups of prehistorians are noteworthy in the Neolithic archaeology of the Near East. Although both concerned primarily with estab


Dorothy Garrod

tween the state of affairs exemplified in these efforts that stimulated Gordon Childe to formulate and proclaim the hypothesis of the *Neolithic Revolution*. Conversely when, with the 1939-45 war over, the Oriental Institute of the University of Chicago assumed the lead and reanimated relishing the chronological sequence of early settlement over the territory between the Mediterranean Sea and the Iranian plateau, their operations, while overlapping, were largely independent. On the one hand were those, pioneered by Dorothy Garrod, concerned first and foremost with establishing the Stone Age sequence from the Middle Paleolithic through the Upper Paleolithic to the terminal hunterforager stage represented in Palestine by the Kebaran and the Natufian, and the Zarzian in Kurdistan. On the other hand, there were those, including on the British side Leonard Woolley, Kathleen Kenyon, Max Mallowan and Seton Lloyd, interested first and

foremost with tracing the origins of settled civilizations by exploring the successive levels of tells from the cities and structures of literate polities down to the earliest villages.
As Graham Clark (23) points out, it was precisely the contrast be


Leonard Woolley

search into the origins of civilization in this area, a prime stimulus was admitted to have been Childe's hypothesis. As befits fieldwork undertaken to test ideas, the campaign as a whole helped to alter the whole climate of thought about the true nature of the process of economic transformation at one time

telescoped in the slogan of the *Neolithic Revolution*. From Childe's original standpoint it is indeed ironic that attention is currently being redirected to the Mesolithic or Epi-paliolithic as the age in which this crucial transformation was first accomplished and then enabled to spread. We shall begin our review of the this time period in the Near East with the foragers in the Levant, later expanding our vista to the Zogros Mountains, Iraqi Kurdistan, and the western foothills of the Iranian Plateau. But before we begin, a few words about the environmental setting of the area in general is warranted.

The Beginning of Settled Life: I n order to begin the examination of this critical and vital period and its effects on the process and timings for the beginning and spread of agriculture throughout the region, we must begin near the end of the Last Glacial Maximum, when Epi-paleolithic hunter-gatherer groups began to adopt new strategies of settlement and subsistence. They started to harvest and store plant foods, and began the shift from mobile foraging to life in semi-permanent settlements. A number of these hunter-gatherer settlements, sometimes called the 'campsites', have proved to be a good deal larger than our conventional idea of smallscale hunter-gatherers communities. Clearly, life in societies with populations in the hundreds, would

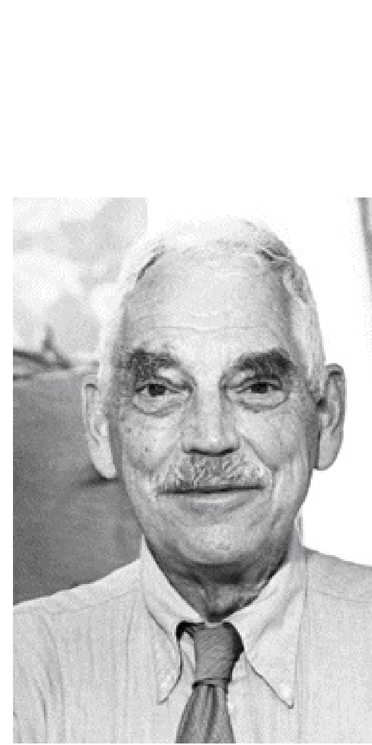
have been very differ



ent from the old way of life in small, mobile groups of flexible membership, numbering 20 or so people at most, and these larger, more complex social groups turned out to be precocious

Kathleen Kenyon

in their development of complex symbolic worlds. It was these sedentary communities existing between the terminal part of the 'Stone Age' and the early part of the Neolithic pe riod who went on to pro duce domesticated crops of cereals and pluses, and to herd probably the



Vere Gordon Childe Robert Braidwood

first domesticated flocks of sheep, goat,and cattle. So although the story may begin with foragers and end with farmers, there are important social, cultural, and cognitive developments that took place along the way.

The warm and wetter climate that developed in southwest Asia at the end of the pleistocene era, about 12,000 years ago, brought about great environmental changes. Open woodlands flourished, with nuts that could be harvested and grasses that had the potential to be domesticated, and the warmer winters enabled communities to move from caves in mountainous areas to regions where wild cereal grasses, such as barley and emmer, grew, and could be gathered. The harvesting of grain, in turn, stimulated the development of such tools as sickle blades and grinding stones, and the building of storage facilities-developments that paved the way for the emergence of agriculture.

Probably the single most important factor in the transition from a hunter-gatherer economy to a food-producing economy was the establishment of settled communities. Plants and animals were originally domesticated as a minor part of a general subsistence strategy, but they soon became so important that farming became an almost universal way of life. The earliest Neolithic settlements were confined to the Levant and the western foothills of the Zagros Mountains. In these regions, and on the uplands of Anatolia, there was sufficient rainfall for wild wheat and barley to grow. As long ago as 9000 BC, people in these areas ate a wide variety of plants, and with time, cereal grains, pulses, and nuts made up an increasing proportion of their diet.

The current method of investigation used by paleoethnobotanists and archaeologists to establish where each plant species was first domesticated is to determine the genetic ancestors of early domestic plants and then to chart the present-day distribution of these wild species. The distribution of these plants, adjusted for changes in climate over time, together with details obtained from plant remains recovered from archaeological sites, provides the necessary information. Similarly, by analyzing the remains of bones in such sites, archaeologists can determine whether animals that were eaten were hunted in the wild or kept in domestic herds. The archaeological record suggests that each of the five species characteristic of Neolithic animal husbandry (sheep, goats, cattle, pigs, and dogs)

was initially domesticated in a different region. By the end of the Neolithic period, after cereals had been domesticated and cultivated, and stock- breeding was established, people in Southwest Asia had developed farming methods geared to openlandscapes. This, in turn, gave rise to urban settlements in the floodplains of the Tigris and Euphrates rivers, in ancient Mesopotamia.

The subject of domestication of plants and animals by pre-Neolithic foragers in South-West Asia, that is, the Near East, in context with Baluchistan has been briefly discussed in Section II and in Section III and IV. In this chapter we advance the discussion a little further and examine the development and spread of the Neolithic culture, including crop cultivation and animal herding, on a lager scale. But before we begin to investigate the development and spread of agriculture in this area, we need to have a look again at the pre-agriculture landscape, this time in somewhat more details.

From Mobile Hunter-Gatherers to Sedentary Foragers: the Early Epi-paleolithic in the Levant, *ca.* 18,000-12,000 BC: A prerequisite for investigating the origin of the Neolithic Revolution or the beginnings of agriculture is to review the archaeological evidence from the Natufian culture and its earlier entities that date to the previous two or three millennia, going back to almost 18,000 years ago. This temporal horizon is generally known in archaeology by the term Late Paleolithic or Epipaleolithic. Some would prefer to call it the Mesolithic. The archaeology of the hunter-gatherers of this period in South-West Asia is relatively well known. Early 20th-century research was concentrated on cave sites and rock shelters in the Mediterranean woodland zone in Israel, but researchers since the 1960s have surveyed extensive areas of the Negev Desert in southern Israel, Sinai, the semi-arid regions of Jordan, and inland Syria. Epipaleolithic sites have been found in all these regions and the corresponding foraging populations of this landscape have been termed *Kebaran* in the west and *Zarzian* in the east. The Kebaran was first defined by Dorothy Garrod following her excavations in 1931 in the Kebara Cave in Mount Carmel, in modern Israel. Kebaran sites are found throughout the Levant from the Mediterranean coast to the steppe deserts of Jordan and Syria, though most are in the higher rainfall regions. Most of the sites consist of surface collections of artifacts, of varying sizes. Some are extremely small (25 sq.m or less), most are 100-150 sq.m, and a few are much larger (500-1,500 sq.m.).

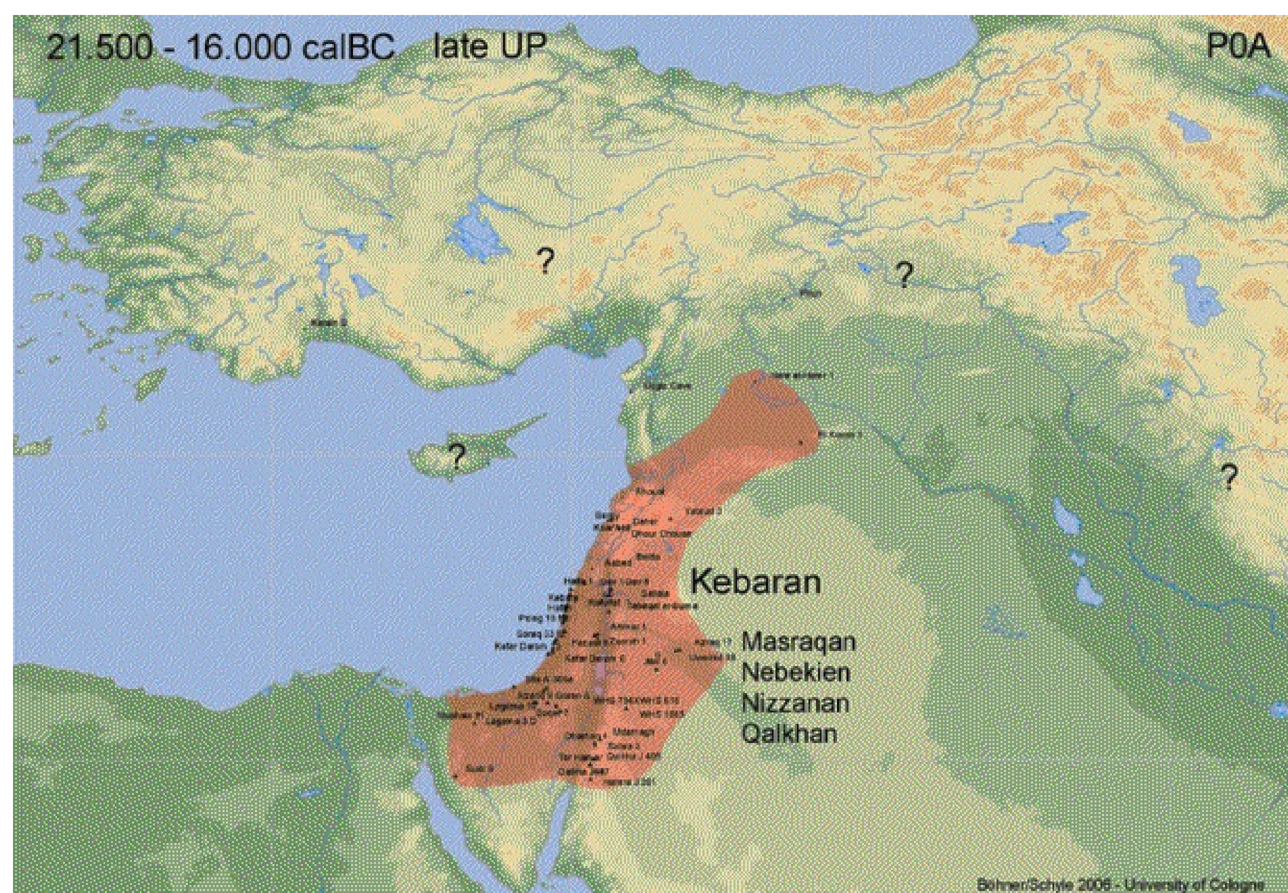
The effects of the Last Glacial Maximum, the amelioration of climatic conditions, and then the return to cooler temperatures and reduced rainfall in the Younger Dryas would, in theory, have been more critical in the marginal zones, the steppe or semi-desert regions, than in the Mediterranean woodland zone. Hunter-gatherer societies operating in semi-arid regions would thus have needed greater adaptive responses than were demanded of the groups occupying the Mediterranean woodland zone. It was not surprising to learn, therefore, that the coolest, driest periods seem to have had little impact on hunter-gatherer occupation in those critical areas, though subsistence strategies continued to adapt and change.

Plant food resources for human consumption (that included stands of wild wheat and barley) were richest in the woodland areas, though the steppe offered a wide if sparsely distributed range of root tubers and seeds. The principal game consisted of gazelle and onager in the Levant and Zagros uplands and steppes, together with ibex and goat, with sheep in the northern and eastern steppes and mountains. There were also wild cattle, fallow deer, roe deer, and wild boar in betterwatered and forested places, as well as smaller game such as hare.

There are sites of all stages of the Epipaleolithic period in the semi-arid zone, though the sparse

remains comprise only stone tools and, at some sites, indications of the animal species exploited. Many of the sites are small and seem to document short-term, seasonal occupation by small groups. Among the stone tools, however, are heavy grinding and pounding implements, which indicate that stored harvests of dry grain and other seeds were being processed.

Henry (24) estimated populations of about fifteen people for the majority of sites, with two or three times that number at the largest sites. The small sites, found especially on the steppes, have assemblages populated by rectangular geometric microliths. The coastal, Jordan valley, and upland sites are generally larger and have more varied assemblages including other microlith forms, blades, and bladelets (46). The latter also tend to have more grinding equipment including small hammerstones and grinding slabs, but Kebaran sites have produced the first mortars (stone bowls and 'cup



zelle at En Gev I, Kebara, and Nahal Oren, for example, goat at Wadi Madamagh, and fallow deer at Ksar Akil (54). A few sites have produced plant remains in small quantities: wild cereals, legumes, and fruits in the Mediterranean zone, and steppe species to the east, though strontium/calcium ratios in human skeletons indicate that Kebarans ate less plant food and more meat than later (Natufian) populations (55) .

By far the best information about Kebaran settlement has come from excavations of Ohalo II, a now-submerged site in the Sea of Galilee in the Jordan valley found in 1989 when the level of the lake dropped by several meters. The site, which has been dated to *ca.*19,000 years ago, measured some 1,500 sq.m, so is an example of one of the largest Kebaran settlements. About a third of the area was excavated, revealing three kidney-shaped structures, the edges of which were delineated by a

Kebaran sites: 21,500-16,000 BC

holes'-boulders with pecked depressions) and pestles. Presumably the heavier equipment was normally cached at a site for use when the site was revisited rather than carried around: a basalt mortar at the site of Hefsibah, for example, would have weighed almost 20 kilograms when complete, and the nearest source of basalt is some 15-20 kilometers away.

The assumption is that most of the upland and steppe Kebaran sites are the campsites of small, highly mobile, bands of foragers, though the balance between hunting and gathering is unclear. The microlithic trapeze rectangles could have been hafted either as arrow tips or sickle blades, but microwear studies indicate that they were more commonly used as arrowheads (24). Faunal samples are rare, but tend to indicate hunting systems geared to particular species at particular sites: gadark line in the soil composed of

charcoal, straw, and vegetable stems presumably marking the walling of some kind of simple huts (25). The earthen floor of one of them had been renewed three times. Hearths were positioned around the structures, and an alignment of burnt stones covered with ash appears to have been a simple oven - if the identification is correct, this would be the earliest evidence yet known for food-roasting strategies. A burial was found on the inland side: a man who had survived to adulthood despite physical disabilities, buried on his back with his legs flexed beneath him and his hands across his chest, with an incised worked bone tool laid underneath his head.
Refuse was dumped on the

lakeside of the camp.The refuse pile contained thousands of bones, especially of fish (10-20 cmlong *Cyprinidae).* Twisted fibers preserved in the organic mud of the site are probably remains of the nets and baskets used to catch and store these fish, the clumping of fish bones in the refuse tip suggesting bagged collections.There were also bones of larger animals such as gazelle and deer, small game such as tortoise and hare, waterfowl and other birds, one interpretation of the number of raptor species amongst the latter such as eagles, buzzards, and vultures being that Kebarans may have started to tame them for falconry. In addition, thousands of carbonized plant remains were recovered from the site, mainly grains and other ear fragments of barley, their brittle rachises indicating that they were morphologically wild. There were also emmer wheat, almond, olive, pistachio, and grapes (all wild forms) and acorns. Starch grains of grass seeds, including barley and possibly wheat, have been recovered from food residues on a grinding stone, the absence of starch grains of roots and tubers (which survive well in such residues) providing useful negative evidence for the importance of seeds in the diet.

The indications are, therefore, that these Kebarans were fishing, fowling, and collecting forest foods such as acorns and almonds around the lake, and also gathering wild cereals and other grass seeds and hunting on the steppeland above. The ripening periods of the plant remains suggest that the grains were being harvested in the spring and the fruits in the late summer and autumn. The conclusion of the excavators is that the Ohalo II community was semi-sedentary, spending most of the year fishing, gathering, and hunting in the Jordan valley, and moving away to higher ground for



Kebaran Cave in Mount Carmel, Israel, excavated by Dorothy Garrod in 1931. Kebaran sites are found throughout the Leant.

shorter periods of gathering and hunting.

Although the predominance of a particular animal in Kebaran faunal samples has been used as evidence of possible specialization at this time as a precursor of herding, the assemblages could also represent special purpose hunting sites. The excavators of Ohalo II suggested that the people might have stored foods such as grains to allow them to remain all the year by the Sea of Galilee, but there are no signs of storage facilities at the site (though they postulated the use of baskets). The remaking of the hut floor also suggests seasonal reuse of the site, rather than sedentism. The Kebarans were certainly collecting a variety of plant foods, but Wright (26) emphasizes the very high costs of processing these, especially at a time when they were sparsely distributed over most of the landscape. Combining the evidence suggests that most Kebarans probably practiced broad-spectrum systems of hunting, fishing, and gathering, spending most of the year in better-watered and vegetated areas but making seasonal sorties to drier parts of the landscape for hunting and plant gathering. By the close of the Late Glacial they were probably relying increasingly on cereals as a staple food, and adapting their seasonal schedule and patterns of mobility to ensure time to harvest, process- and perhaps store-grain.

Contemporary Zarzian communities (named after the cave of Zarzi in Iraq) in the Zagros mountains are much less understood, principally because much of the area has been closed to archaeological field teams since the late 1960s. Almost all the data derive from cave excavations in the late 1950s and early 1960s, such as Shanidar. Zarzian lithic technology included blades, bladelets, small scrapers, and geometric microliths much as in the Kebaran, and there are also small coarse grinding stones, but

these are thought to have been used mostly for grinding pigments. Plant foods were probably much less plentiful than in the Levant. The main ungulates were sheep and goats, goats especially in higher, rockier, places and sheep in lower, gentler, topographies, though their distributions would have overlapped, especially as both probably moved to higher ground in summer and lower ground in winter. However, goat seems to have been the main species hunted by Zarzians, a tradition going back to the Middle Palaeolithic at Shanidar, and onager at lower elevations. Other species represented at Zarzian Shanidar included red deer, fallow deer, roe deer, pig, and beaver, waterfowl, river clams, and fish. Both sheep and goats were hunted at Ghar-i-Khar (25).

Hole and Flannery (28) argued for logistical systems of hunting and gathering at this time, with caves such as Shanidar being seasonal base camps supplied by foraging parties using shortduration campsites elsewhere. Little evidence has been produced since to change this model. Though the lack of recent evidence needs to be emphasized, it does seem probable that plant gathering was on a much smaller scale in the Zagros during the Late Glacial than in the Levant, that Zarzian subsistence relied heavily on hunting, and that their territorial behavior was characterized by marked seasonal mobility (25).

The Natufian Foragers *ca. 13,000-9500 BC:* The earliest stable settlements of huntergatherers come from the eastern Mediterranean (Israel, Jordan and Syria) and an archaeological assemblage called the Natufian. It is known from many sites ranging from the banks of the Euphrates River in Syria (Tell Mureybit) to the Negev Desert in the south. The Natufian assemblage was first defined by Dorothy Garrod (1932) following her excavations at Shukba Cave. There is a rich bibliography on these fascinating peoples but the best sources for the general reader still remain that of Anna Belfer-Cohen and Offer Bar-Yosef (27). A more recent review is from Graeme Barker (25). In terms of the regional archaeological sequence, the Natufian follows the widespread Kebaran assemblage beginning at 11,000, which is presented in detail by Henry (24). The Natufian archaeological assemblage persists in recognizable form until *ca.* 8500 BC (27).

One of the most ancient settlements of sedentary foragers in the Near East is known to date in Jordan at ancient Jericho, near the Dead Sea. It is one of a series of archaeological sites in the Levant and southern Turkey that are connected to the Natufian culture. Other well-known sites are El Wad, in the Mount Carmel area, and Ain Mallaha, in the Jordan Valley. Some of these sites date back to 12,500 years ago.

Jericho began as a camp of Natufian hunters and food gatherers about 9000 BC. Archaeologist Kathleen M. Kenyon re-excavated the site in the 1950s, with remarkable results. By 8000 BC, a massive stone wall enclosed the settlement. On the bedrock that lies below the accumulated debris of Neolithic settlements and later civilizations, Natufian implements have been found, along with traces of a stone structure dating from about 7800 BC. This structure had sockets for massive poles - possibly totem poles - which suggests that it was a sanctuary or shrine. It would appear that Natufian hunters were accustomed to visiting the spring nearby, and recognizing its importance, established a holy place beside it.

Muddy land, watered by the spring, provided excellent conditions for cereal cultivation in an otherwise arid environment. By 7500 BC, Jericho had grown to a size of 1.6 hectares (4 acres). The people of early Jericho lived in mud brick huts clustered within the stone wall, but they did not make clay vessels. The huts were circular, with floors of beaten mud, and their walls inclined inwards,

suggesting that they were once domed. They may have been roofed with plastered branches, as there are many traces of wattle and daub in the walls.

It is unlikely that early Jericho's economy was based solely on agriculture. Imports found in the area include obsidian from Anatolia, turquoise from Sinai, and cowrie shells from the Red Sea.

Some Natufian sites are obviously temporary camps, used by people collecting seasonally avail- able plants or animals, or on special journeys to acquire other resources, such as basalt for grinding stones.The larger sites - of more than 1,000 square meters (3,280 square feet), with deposits up to 3 meters (10 feet) thick - were not necessarily yearround settlements but may simply represent the accumulated debris of communities that used the same site for part of the year over several years. Different groups were almost certainly living in a variety of ways at this time - for instance, some may have been semi-sedentary, others nomadic - depending on the local environment, the resources available, and each group's preferences. Certainly, most Natufian settlements were used more intensively than sites from earlier periods, and the Natufian culture was more elaborate and varied than any before it.

The Natufian culture is characterized by small villages of circular, stone-walled huts and relatively large populations. Artifacts include numerous mortars and grinding stones, apparently used for grind



Early Natufian settlements in the Near East - 13,000 to 11,000 BC

ing grains and seeds, and many-toothed blades of flint, which often still bear what is known as a sickle sheen along their cutting edges, indicating that they were used for harvesting wild cereals. No domestic plants or animals have been identified at Natufian sites, although the bones of many hunted animals have been found. The largest Natufian sites and cemeteries contain considerable evidence to suggest that Natufian society was hierarchical and that such commodities as seashells, obsidian, and stone bowls were widely exchanged between communities.

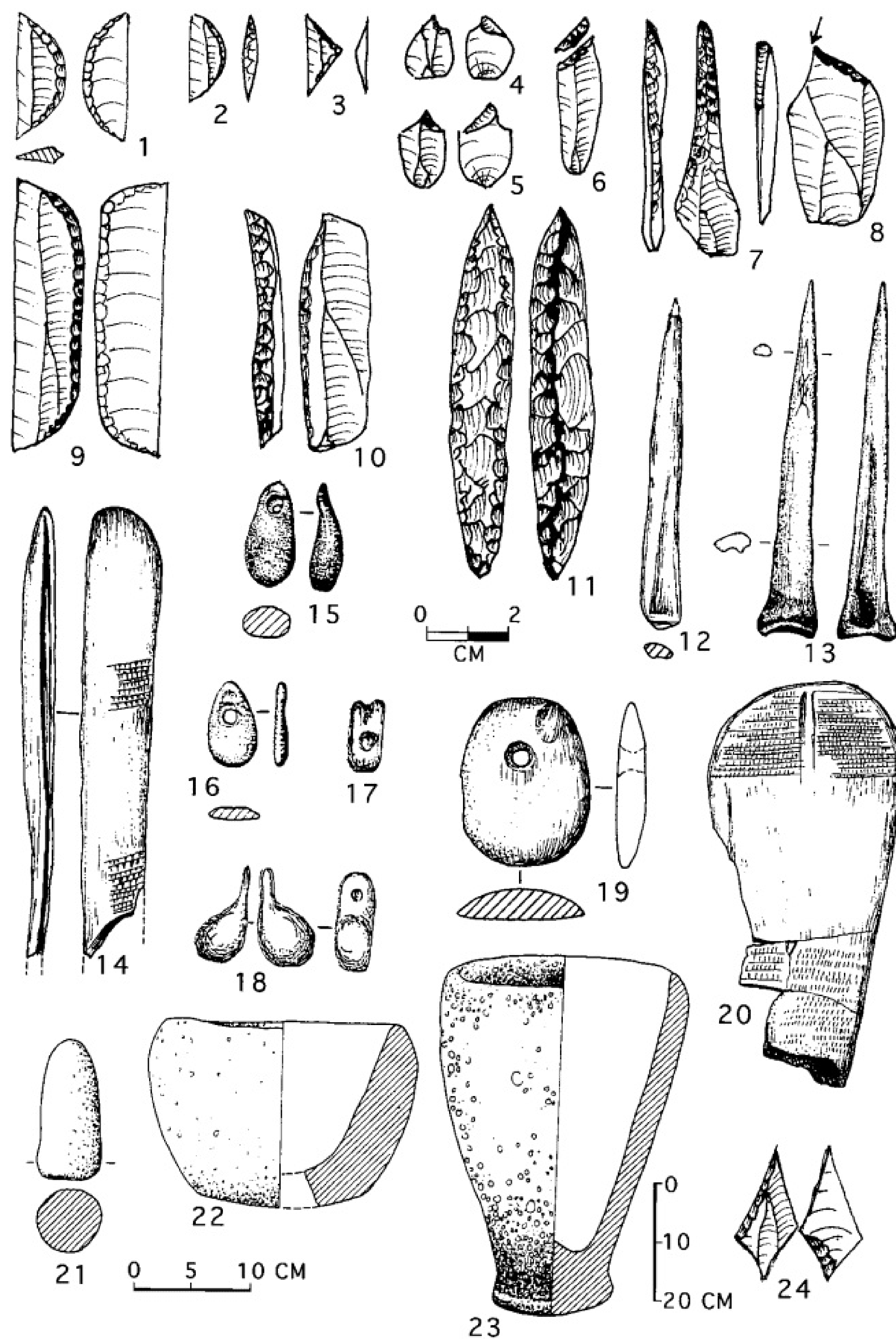
According to the terminology of the day, the proliferation of microliths and in particular the lunates led the researchers to define the Natufian assemblages as Mesolithic. This label, in Europe, meant early post-Glacial hunters. However, they also uncovered numerous sickle blades (identifiable by their special sheen) and mortars and pestles. The intuitive conclusion was that "it may seem surprising that we get the evidence of agriculture at such an early date among people who possess no pottery and do not appear to have domesticated animals" (29). This interpretation that Natufian sites were farming communities was later challenged, but the importance of these discoveries as evidence in the search for the origins of agriculture in western Asia did not escape the eyes of most scholars. For example, Childe noted that "only one culture is known today that can lay claim plausibly to temporal priority and transitional status. The chronological position of the Natufian before the local Neolithic in the Palestinian culture sequence has been established stratigraphically at Jericho. The Jerichoan Neolithic could be derived from the Natufian Mesolithic" (30). Hence, the relative archaeological sequence was already established in the excavations of the 1930s.

Though there were similarities with the Kebaran in terms of some aspects of lithic technology, the overwhelming impression was of transformations in material culture, with the appearance of houses, elaborate burials, an array of artifacts suggesting plant use (mortars and pestles, sickle blades), and a rich bone technology that included elaborately decorated items. Garrod concluded (31) that the changes were so striking that Natufians might be an intrusive people, but everybody now agrees that Natufian culture has to be explained as an indigenous phenomenon.

Though many of the phenomena observed in the Natufian, such as the ordered burial grounds and the wealth of artistic

previous more subtle changes may have occurred that are unobservable in the available archaeological evidence (32).

The inquiry concerning the emergence of the Natufian in a world of foragers remains controversial as does its transformation to a Neolithic population subsisting on cultivation, hunting, and fishing. Proposed explanations are derived from the realm of ecological adaptations and/or culture history currently enhanced by stressing the social factors in societal changes such as the role of human agency and symbols. In the past the process of cultural development was regarded as gradual, but as



Fi g u r e 6. N a

tufi**Selected artifacts from the Early Natufian**
u n a t e ; 2, lu n a t e ; 3,

t ri a n g l e ; 4 a n d 5, m i c ro b u rins (p ro d u c ts o f a
b l a d e l e t; 7, b o r e r; 8, b u rin; 9, H e lw a n sic kl e b l
12 a n d 13, b o n e p o ints; 14, d e c o r a t e d b ro k e n

r a t e d b o n e sp a tu l a ; 21, p e stl e ; 22, m o rt a r; 23,
sp e c i a l sn a p p in g t e c h n i q u e); 6, tru n c a t e d

a d e ; 10 , a b ru p tlyr e t o u c h e d si c kl e b l a d e ; 11, p i c k; si c kl e h a ft; 15–19, b o n e p e n d a nts; 20, d e c o
d e e p m o rt a r m a d e o f b a s a lt; 24, H a rif p o int . N o t e th a n d o th e lith i c s a n d b o n e o b j e c ts.

a detailed C-14 chronology has been established from
figurine from the Nahal O ren site has numerous itan owl at one end and a dog' excavations,
s head at
the othehas become clear that thecore with a man's head at one end andrelaa bovid' Natufian emerged
s head at the other end. This
combination of human and animaltively suddenly throughout
might have emerged from similar ideo-
the Levant, probably within
logical changes that led to the joint dog and human bu
a few centuries.Though
Figurines that represent the humanas abody ororiginally regarded
face are rare; only a few, made
of limestone, haHolocene phenomenon
exception is the Ain Sakkhri limestone figu
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r ine, interpreted as representing a mating couple.Mesolithic, the Natufian is include a tofirmlytoise, a kneeling gazelle,

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T he attentionthe
appeaPleistocene. Most authors rather curious, but perhaps represents
a totemic gdate its beginning to about
11,000 BC, but recalibra
on both bone and stone objects in-
tion pushes this back fur
clude the net, chevron (or zigzag), and
meandether to nearer 13,000 BC.
spatulas, stone bowls, shaft-straighten-
It is also clear now that
ers, and the rare ostrich-egg shell con-
tainethere were significant culNegev sites.54Because these differ from
site to site, they may futural developments withinrther our iden-
tification of diffethe Natufian, so the evi
Fo r the time being, we know that their f
r
equencies a
r
dence is commonly divided

e highest

into Early and Latee-

within the Natufian homeland in the cent Navant.[94]tufian.

Early Natufian: The Subsistenc eEarly Natuifian is important

Most Natufian sites wepurposere excavated for our this before the introduction, in the latein

1960s, ofbook as it representsy techniques such as the

systematic d ry sieving and floatation. same kind of culture that

However, even in recent excavations

wateWe flotation has failed tohave rifetrie

would corre

sufficient quantities of flo

sponding pre-Holocene

In some cases, the few grains found

wesites were available to us spectat or near Mehrgarh in thepoor preservation of vegetal remains

in Natufian sites within the MediteKachi plains at the Sindh

manifestation, appear for the first time in the localth a t th e g ro u n d st o n e t o o ls h a v e d iff e r e nt s c a l e s

Baluchistan border. The terrain and climatic envi

ture of the prevailing terra rossa soil. de

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ronment were more or less the same, the flora and

Occupational deposits in open-air sites

basalt bowls, wefauna comparable, and the subsequent Neolithic

the houses of Wadi Hammeh.[27,56,88] and crack in summer. In the process, Po

r

table natu

r

developments surprisingly equivalent if not identical.

alistic and schematic plant remains are destroyed; charcoal,

figu Since we do not have any excavated site of this era prehistoric record, the Natufian is unique mainlyof distinct group identities. Severalbecause it constitutes the first deviation from theom the traditional way of prehistoric living. Instead of no

rounded structures inside Hayonim

Cave ar e incised, mostly with the lad-madic hunter-gatherers, living in small groups (nueted as the clear or extended families) and practicing a well

accumulated effects of notational

ma rks.90,91On one large slab, the roughestablished mode of resource exploitation, we havem of a fish is deeply

incised. Large in the Natufian indications of sedentism, of larger ed limestone slabs with the mean- groups functioning at a higher level of social organization and exhibiting different patterns of resource exploitation, namely, intensive and specialized collection and possibly incipient agriculture.This basic change occurred about 12,000 years ago, though

include carvings on sickle hafts and
in Pakistan or anywhere else in the neighborhood,

isolated bone pieces (Fig. 7). Se veral jected to both downward and upward movements. Better charcoal preserva-

of these figu
the Natufian provides us valuable foundation to
lates, possibly gazelles.[88] A limestone Negev and drier deep deposits of sites speculate on the late hunter-gatherers cultures in
Baluchistan and the nearby areas of Sindh.

The heartland of the Early Natufian settlement, in terms of the most substantial sites, elaborate material culture, and probably the densest populations, was the better-watered areas of southern Levant, the Mediterranean littoral, and the Jordan valley, areas with more than 200 millimeters of rainfall today. The area is variously referred to in the archaeological literature as the 'coastal and forest zone' or the 'Levantine corridor'. Presumably there were also many sites on the Mediterranean coast that are now submerged. Many caves were used,



Fig u r e 5 **An Early Natufian decorated** o d (p h o t o g r a p h

by S . Bu

skul from El-Wad, excavated by Natufians adopted the use of sickles for harvesting because of thei r need to maximize yield and minimize time, **Dorothy Garrod** e employed for food the r eason being the limited availabil-

ity of fields of wild stands.3,82

processing as well as fo r crushing

burned limestone and red ochre.41,84 about 100 k m away. Microscopic obser vations have demonstrated that ground

G round Stone Tools

Such tools, including bed rock mor tars, portable mortars, bowls of var- ous types, cupholes, mullers, and pestles, occur in large number s in

A mong the grooved stones are whet- stones made of sandstone, which were used for shaping bone objects. Shaft straighteners, identified on the basis of ethnographic comparisons, have a deep, parallel-sided groove and bear burning marks. These mar

but Ev o lut most o g y sites are

io n a ry A ntho p o 165

open-air camps, tity.85–87 Objects were made of bone

shafts and of teeth and ho

from gazelles, wolv their sizes varying

deer, and birds. Use-wear analysis indi-

cates that bone tools weconsiderably r from hideworking and basketry.63 Barbed

items ha

of hunting de under 350 sq.m to

hooks and go rgets for fishing, and

hafts foover sickle blades. Bone beads and
pendants we e shaped by g5,000 sq.m. drilling. Most,jects bea

decorations. mong these athough, arecarved hafts f rom El-Wad and Kebara
Cave with young

edge and the pieces f1,000-2,000 sq.m,
Cave bearing net patte

5-10 times larger
O rnamenta tion and Art O b je cts
Body decothan Kebaran sites.tions demonstrate variability between

Populations of sevThe Naeralan ihundred peoby a boneindustry tha t is

fa r rple have been escon a ins more

e la bora te , va rtimated for the

molargesthan doesites, butany e a rlier or la ter

L evancommunities of upentity
to about 50 people
and within sites, as well as change are indicated more

over time. A variety of marine mol-
luscs, bone, g

dants, and beads wegenerally. Such

Natufians in headgea r , necklaces, belts,
bracelets, and ea Marine shells fo

we
permanentes of the
Medite erarely, water
were brought from the Red Sea. Ain
r Natufian jewelrysites were near to

and presumably fuelwood, and had good access on dant in the more ephemerally occu-

pied camps. The boulder mortars, shafts, indicate the use of bows by the

Natufians.
shell from the Atlantic ocean and a freshwater bivalve from the Nile

the one hand to more forested localities where therervers41,89 Greenstone and malachite as much as 100 to 150 kg and are 70 to beads were brought from as yet un-

were nuts, stands of wild cereals, and deer, and onr

lowermost part, these objects were The Natufian is marked by a bonenatolian
the other, to more open habitats with grassland
in the Mount Carmel sites were morphologies than does any earlier or differences in jewelry between the sites

seeds and gazelle. Such settlements were probably occupied for several seasons, though most probably not for the whole year. Studies of cementum bands in gazelle teeth indicate That many sites were multi-seasonal, and sites such as Hayonim have 'commensal' species (species associated with humans and human settlement) such as the house mouse, house sparrow, and rat. Gazelle usually make up the bulk of the faunal samples at these sites, together with other steppe species such as goats and onagers, though forest species are also well represented such as fallow deer, cattle, red deer, and roe deer. There is also evidence at a few sites for marine and freshwater fish, and for birds, especially

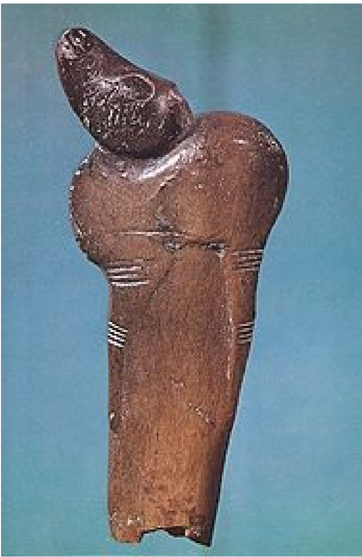
waterfowl. Plant remains include wild barley, wild lentils, wild chick peas, and acorns at Wadi Hammeh, and wild barley, legumes, and almonds. No doubt some of the small sites on adjacent steppes such as in the Negev and on the Jordanian plateau are campsites used by hunting and/ or gathering parties making short sorties to collect the food that sustained these larger settlements. The site of Rosh Horesha, for example, had complete carcasses of gazelle but only selected joints of goat, suggesting longer forays for hunting goats than gazelles. Presumably people from the main settlements split up into smaller groups for part of the year, camping elsewhere in the corridor or adjacent steppes.

The expansion of park woodland over the steppes also enabled Early Natufians to colonize hitherto-hostile regions such as the Negev desert of Israel, the basalt 'black desert' of eastern Jordan and Syria, and the northern steppes. They were able to establish rather comparable systems of settlement to those of the Levantine corridor at similar ecotonal locations, such as around the edge of the Azraq basin, at Taibe in the Kum basin, and at Mureybit and Abu Hureyra. Abu Hureyra was presumably at the hub of a series of short-duration campsites used by hunting and gathering parties leaving the main settlement for a few days. There is evidence that the Natufians at Abu Hureyra were systematically harvesting wild einkorn and barley and over twenty other species (fruits, nuts, legumes, and other seeds) from the steppe and valley, as well as others probably used as flavorings, medicines, and dyes

There has been a long-running debate on the subsistence systems practiced by Natufians. Were they sedentary or mobile? Did they rely more on plant foods or meat? Did they simply gather wild plants or had they started to cultivate them? Did they hunt gazelle or herd them?

The current evidence points to the Early Natufians as those who initiated intentional cultivation. In a simplified version of the evolutionary trajectory, it seems that the new social structures of Early Natufian sedentary hamlets replaced the former so-called egalitarian mobile foragers and enjoyed rapid population growth, as well as an increasing degree of inequality. Assuming that this scenario is correct, an interesting task for prehistorians would be to find "how" and "why" these unpredictable consecutive changes were triggered and sustained. The question can be alternatively phrased as: What happened within the Natufian society during the three millennia of its duration that resulted in the emergence of farming communities?

Natufian flint assemblages are characterized by the dominance of lunate-shaped microliths, the use of bifacials, and the use of the microburin technique. The chipped stone technology of the main Natufian settlements included geometric microliths, broad bladelets, scrapers, and sickle blades, and a few heavier tools. In addition, new tool types appear - sickle blades, picks, and axes - frequent in the flint assemblages of the succeeding



Decorated sickle haft from Nutafian level at El Wad Cave, Israel

agricultural entities (33). Microwear studies, together with traces of mastic on some flints, indicate that the microliths were hafted as composite arrowheads. Analysis of Natufian industries indicates that a wide range of activities was practiced in the coastal and forest regions, including more plant gathering (more sickles, high frequencies of flint tools other than microliths) than at the steppe sites. Some of the latter consist mainly of geometric microliths, others have more scrapers and denticulates.



Double bedrock mortar on the surface of Shubayqa 1, in the northern Badia region of eastern Jordan, a Natufian site (*Shubayqa Archaeological Project, 2012***)**

Besides a rich microlithic industry, grindstone mortars, bowls and cup-holes that first appeared in the earlier Upper Paleolithic contexts are considered to indicate Their invention marks from Paleolithic plant food preparations. It heralded the "broad spectrum exploitation" of plants and animals that was conceived as a prerequisite for the agricultural revolution (34) and is supported by a recent discovery of carbonized plant remains in a waterlogged site, Ohallo II, dated to 21,000 years ago. It is commonly argued that mortars and pestles would have been used mainly for grinding nuts, and

querns and handstones for seeds. Most of the groundstone assemblages are made of limestone, but basalt and sandstone artifacts have also been transported over considerable distances (30 km and more), either as complete items or as raw material, probably traded by the locals from other groups. Quite a few instances of stone beads and other decorative and decorated elements also occur.

The assemblages from the core area are substantially different from assemblages found further away. Most of the Natufian core area sites have yielded rich bone assemblages, of both functional and decorative items. Microscopic studies of usewear traces reveal that a significant proportion of the functional items had been used mostly for weaving and hide-working (35). A change in the production technique of worked bone items is noticeable: vegetal food processing. a revolutionary departure While most of the functional artifacts had been shaped by scraping and shaving, a technique used for woodworking, the beads and pendants were shaped by grinding. Grinding was the common technique for working bone in the succeeding Neolithic cultures, but it is practically unknown from earlier bone industries. Several unique items have been recovered: bone hafts (presumably for sickle blades), and some decorated items of unknown function (32).

Natufian ornaments are varied and numerous. Beads and pendants are made of limestone, basalt, greenstone, and malachite, as well as of bone, teeth, and a great variety of marine shells. Exotic materials, though rare, testify to connections with neighboring regions. Thus obsidian found at Eynan had been brought from Anatolia, greenstone from Syria, Jordan, or Nile. A number of stone and bone figurines have been found, mostly of animals but some human representations as well. There are also incised limestone slabs with geometric and figurative patterns, used as decorative elements in architectural contexts. While many of the beads and pendants - i.e. personal omaments - have been recovered from burials, the other artistic items were found only in the living areas.



Natufian Bone Beads, Kebara Cave, Natufian layer, ca. 12,000 years ago. **(***Dorothy Garrod, from Wesleyan collection***)**

Most Natufian sites are tens of kilometers from the Mediterranean coast, and the Red Sea region is beyond the area of Natufian settlement. There were no sources of black basalt nearby, yet the Natufians possessed basalt basins, mortars,and grinding stones. These materials, along with the very

rare occurrences on Natufian sites of obsidian (a volcanic glass that was chipped like flint) from central Turkey, indicate that long-distance exchange networks were in existence at this period. The basalt pounding and grinding tools played an important economic role, but the decoration carved on some of the mortars indicates that they also had social value. Obsidian was so rare that we must conclude that the social exchanges involved outweighed any functional or economic role. The extensive use of marine shells for personal ornament again stresses the social and cultural significance of



Tools from Zawi Chemi settlement. On the right is a curved bone sickle handle and beside it a bone reaping knife with a flint blade.

clining returns from the networks of exchange that linked together communities throughout the Levant and beyond.

Furthermore, many of the settlements have burials, and there are indications of varied treatment of the dead. In the Early Natufian in particular, adults, children, and infants were normally buried together, especially under the floors of structures, though others were buried nearby. Some were extended, others flexed (with the knees drawn up towards the chin). Some bodies were buried wearing clothes with shell ornaments, but scarcely any burials were accompanied by what might be considered to be grave goods; one female burial at Eynan was accompanied by the body of a dog (the occurrence

of a domesticated animal). A very small number of bodies are lacking the skull, evidence of a ritual practice that became typical in the early Neolithic and is discussed in more details elsewhere. Some Natufian sites have produced dozens of burials in cemeteries, while other sites have no burials at all. On those sites with cemeteries, the several dozen burials by no means account for the population of the associated settlements, which were occupied over many centuries. The composition and locations

of the burials suggest that the family or household was now the residential unit, as in traditional agricultural societies.

Through the course of the Early Natufian, the climate gradually became colder and drier, accelerating at about 11,000 BC as the Younger Dryas cold stage developed. The rising populations of the Early Natufian were now confronted by suddenly deforaging. For example, the

sharp change in climate affected the ability of the wild cereals to photosynthesize, and diminished their productivity. People responded to the crisis in different ways: some moved; some diversified their subsistence system; and some intensified it, though overall there are indications of poorer diet and declining health.

In the middle Euphrates valley, Abu Hureyra was abandoned as the park woodland and cereals retreated from its environs. Similar foci of settlement in the steppe region such as Azraq and El Kowm were also abandoned. In the Negev and Sinai, people responded to increasing aridity by broadening their subsistence base. Sites such as Rosh Zin and Rosh Horesha, with dwellings and storage pits, are interpreted as the summer aggregation camps of foraging groups surviving in the Negev at this time by plant collection and broad-spectrum hunting (36). Pressure would have been worst, though, in the primary zone of Natufian settlement, the Levantine corridor. One response here was to focus ever more intensively on gazelle hunting: greater numbers of juveniles reflect hunting pressure on the gazelle herds, and greater numbers of males may indicate deliberate attempts to conserve the herds better. Increasing frequencies of microliths are often taken to indicate an increase in hunting, but the skeletal studies generally show increasing quantities of plant food in the diet, so it seems likely that people in the Levantine corridor were trying to ameliorate their plight by hunting an ever wider range of game, and further afield, though in fact for fewer returns (37). It is interesting that at Beidha the faunal sample has fewer goats, the natural habitat of which was the relatively lush cliffs and slopes around the site, and more ibex, an animal that had to be hunted further away in the arid gorges of the Wadi Araba rift valley. Mainly, though, Natufians here began to concentrate even more on collecting cereals even though they were hard work to process, relatively unpalatable to eat with the technology available (making some kind of gruel or porridge), and declining in their distributions.

Places that had been ideal for mixed hunting, fishing, and gathering were less suitable for cereal stands and dependable water supplies. Better locations for cereals in the new climatic regime were the lowland alluvial soils of the kind being exposed by the shrinking lakes of the Jordan valley, at places like Jericho. However, increasing intervention would have been necessary to promote cereal growth in such places, which had not been primary cereal habitats. On these alluvial soils, preparing ground, transplanting seeds, weeding out competitor plants and so on would have been necessary to sustain cereal yields in the face of Younger Dryas aridity and cold. Such activities perforce drew people into the gamut of activities we define as horticulture, in time including deliberate seed selection. Also, the greater commitment to nurturing cereals in particular locations meant less mobility, and fewer opportunities for hunting, further propelling people into a greater dependency on plants.

Late Natufian: These developments necessarily would have entailed profound changes in social interaction, including increasingly complex social obligations and scheduling. Details are unclear because of the nature of archaeological data, but these changes were reflected in the widespread use of expressive art as evidenced in tools, items of personal adornment, figurines, and building

decoration. This outburst of symbolic expression emphasized the natural world with the regular use of the meander pattern and zoomorphic imagery in three dimensions, while human images were uncommon and genderless. It also included incised bone and limestone objects that may have contained encoded information. Although the interpretive potential has yet to be fully realized, symbolic expressions of this nature may have played an important role in reinforcing new forms of social interaction.

The intensity of Natufian building activities is manifested by dwelling structures (some with stone pavements), hearths, built graves, and various other installations such as the paved or limewashed pits interpreted elsewhere as storage bins. Most of the building material consists of uncut limestone slabs, and there is evidence for the use of lime, as well as a lime kiln uncovered in Hayonim Cave in the Western Galilee. The investment in settlements, the presence of jewelry, bone carving and art suggests a kind of prosperity for the Natufians, They also participated in regional trading networks in nonessential objects (obsidian and shell). The obsidian was a utilitarian material, and although it makes very sharp tools it is hardly a necessity. The shells, which were used as ornaments, might even be thought of as luxury items and these people may be good representatives of an early "affluent society."

Late Natufian burials consist generally of single interments in cemeteries, rather than household clusters. Detached human skulls at sites such as 'Ain Mallaha, Shukbah, and Nahal Oren suggest that the skull cults found later at Neolithic Jericho (skulls with human features modelled onto them in clay) had their origins in Natufian funerary ideologies. There were also increasing networks of exchange, over longer distances, the increasing circulation of what seem to have been status symbols (such as shells from the Mediterranean, the Sea of Galilee, and the Red Sea) indicating an increasing concern with rank and prestige. Together, the changes in burial and exchange suggest the development amongst Late Natufian societies of new community-wide, rather than kin-based, positions of status and systems of decision-making (24). An important focus of such community-wide authority at alluvial settlements such as Jericho would presumably have been the control of critical resources such as stands of oak trees and of cereals, particularly as community investment in tending the latter increased. Matrilocality and endogamy would have been further reinforced by these developments. Whether gender roles shifted with increasingly interventionist most of the cereal work, another is that men were increasingly involved in activities such as ground preparation and transplanting.

More than 400 burials have been recovered so far from Natufian cemeteries. Most of them are multiple, orderly arranged burials, though occasionally solitary burials have also been encountered. Burial positions are varied (flexed, extended, on the side, head facing to the north or to the south, etc), as is the number of burials per grave (single burials or group burials in mixed compositions of women, men, and children). Decorated burials - of children, women, or men - are rare. Burials are of every possible variety: primary and secondary, interned in pits
- sometimes stone lined or lime washed or in built graves, occasionally with stone pavements or stone coverings. Some graves had been re-opened to enable new burials, while others remained sealed.

Certainmortuarycustomsunderwent changes or disappeared altogether during the Natufian sequence. Thus the decoration of burials seems to have ceased in the later Natufian, apparently at about the same time as the novel custom appeared, of skull removal and separate burial apart from the skeleton. This

custom, first reported from the agricultural Neolithic societies, has been considered to be an element of an ancestors cult, denoting ownership and emotional ties to a locality, and implying the existence of defined territories. Whether the same is true for the Natufian is hard to tell, but undoubtedly there are indications of a certain continuity between Natufian mortuary practices and those of the Neolithic cultures to come - including, for example, the strict separation between living quarters and burial grounds.

It is of interest that the Natufians, as the earliest known settled people, were no strangers to war or to religion, two characteristic of human activities that shaped societies before and since. The Natufians have consistently been portrayed as peaceful but closer examination of remains from one site has recently shown evidence of violent conflict between Natufian groups (25).

Circular Houses: The few complete Natufian houses that have been excavated are circular or elliptical and up to 10 meters (30 feet) in diameter At some sites, there is evidence of houses having been rebuilt on the same alignment as many as three times. Natufian dwellings consisted of a circle of stones *only* one course high, with an opening in part of the wall spanned by posts. The walls must have been made of some perishable material, probably a combination of reed matting and mud. Internal postholes indicate that the houses had roofs. Most have several features within them, mainly fireplaces surrounded by stones and a raised rectangular area made of stones or tamped earth, which may have been a food preparation area. Shallow pits, roughly plastered with mud, and stone-lined basins have also been found, and have often been identified as grain storage bins or silos. None has been reported as containing grains, however, and there are many examples of these pits being used as graves.

Although we have no idea what clothing was worn, we do know that, at least in death, body ornament was considered appropriate. Necklaces, headdresses, and belts made of mollusk shells or the toe bones of gazelles were found with many skeletons. Other animal bones were also found, but less frequently, and some skeletons were marked with colored ochers. There was no pattern to the bUrials, some being primary, others secondary; some indiVidual, some multiple. One remarkable grave contained the skeletons of a child and a puppy. Many sites have graves of adults and children within theboundaries of the site, and often within houses. We have no way of knowing whether houses were abandoned after they had been used for burials.

The Natufian Toolkit: The characteristic stone tools of the Natufians are blades and bladelets, microlithic tools being the most common. Some microliths were mounted in wood or bone handles, and it seems likely that some were used for hunting, although no weapons specifically designed for hunting have been found. The most remarkable of the composite tools are sickles, which have been discovered lying on floors, some with their tiny bladelets still in grooves in the handles. The sheen on the cutting edges shows that they were used to gather plants, but whether cereals, vegetables, or reeds is not known. Artifacts were clearly produced on a large scale:more ground stone tools - in the form of mortars, pestles, hand mills, shaft straighteners, and shallow bowls - are found on a typical large Natufian site than have been recovered from all the sites known from the immediately preceding periods put together. In contrast with earlier periods, most stone tools have been found within houses or other structures. It has been commonly assumed that the mortars and pestles were used for processing plant foods, but the only recorded residues on the pestles are of ocher.

Some of the mortars have linear decoration incised around the outer rim, and this practice of

decorating utilitarian objects marks a dramatic change from earlier periods. While art is known from quite early times portable art and the decoration of tools such as mortars and sickle handles became much more common in the Natufian period. Sculptured objects that are not tools have also been found, but perhaps what speak most eloquently from the past are the collections of what appear to be souvenirs-river-smoothed agate pebbles, fossils, odd-shaped or pretty colored stones-found within Natufian dwellings. These are the kinds of souvenirs we our- selves might collect when wander- ing about the countryside.

Food Sources: These ancient people had a varied diet, but probably relied mainly on plant foods. The numerous finds of sickles, mortars, and hand mills imply that either the types of plants they ate or the way food was processed had changed from earlier periods. Their favored prey were the larger animals, such as gazelles, cattle, pigs, deer, and members of the horse family, but they also ate migratory birds; small animals, such as hares; and aquatic animals, such as turtles, fish, and shellfish.portable art and the decoration of tools such as mortars and sickle handles became much more common in the Natufian period. Sculptured objects that are not tools have also been found, but perhaps what speak most eloquently from the past are the collections of what appear to be souvenirsriver-smoothed agate pebbles, fossils, odd-shaped or pretty colored stones-found within Natufian dwellings. These are the kinds of souvenirs we our- selves might collect when wander- ing about the countryside.

PPNA Foragers-Farmers: ca. 9500-8500 BC: The transition to an unmistakably food producing subsistence system in this region involves an assemblage, first defined at Jerico, known as "PrePottery Neolithic A" widely abbreviated "PPNA". It has been divided recently into two phases: the has been divided recently into two phases: the 7300 BC). The Khiamain is relatively simple and not as well known compared to the slightly later Sultanian, but in most respects they are similar, differences being matters of degree, not of a kind (38). The houses are round or oval and semisubterranean, like those of the earlier inhabitants of the area (the Natufian foragers), discussed in Section II.3, but greater investment is seen in the form of the early use of mud bricks, rather than the temporary walls of the preceding time. PPN"A" is followed by the Pre-Pottery "B" assemblage (abbreviated PPNB), a more thoroughly developed village farming and herding complex.

PPNA sites vary considerably in size. There are very small surface scatters (*ca*.100-150 sq.m), medium-sized sites (*ca.* 2,000-3,000 sq.m), and a few larger ones of 2-3 hectares, the latter with architectural remains. Given that most preceding Natufian sites (Chapter II.3) measured *ca. ca.* 2,000 sq.m, this evidence suggests that significantly more people were now living together, especially in the Levantine corridor, where populations of a few thousands have been estimated for the largest sites. Jericho remains unique in that the settlement was enclosed by a substantial wall at this time, though it is unclear whether this was built to defend the site against people, or flooding, or both (39). Most other PPNA settlements in the Levant have much more modest architecture. Netiv Hagdud is typical, with oval semi-subterranean structures in form much like Natufian structures, 4-6 meters long and without internal divisions, but more substantially constructed, made of various combinations of stones, mud, and crude loaf-shaped bricks dried in the sun. Such structures are assumed to have been conical huts, though other dwellings may have had flat roofs. Plastered floors and internal hearths suggest that most structures are dwellings.

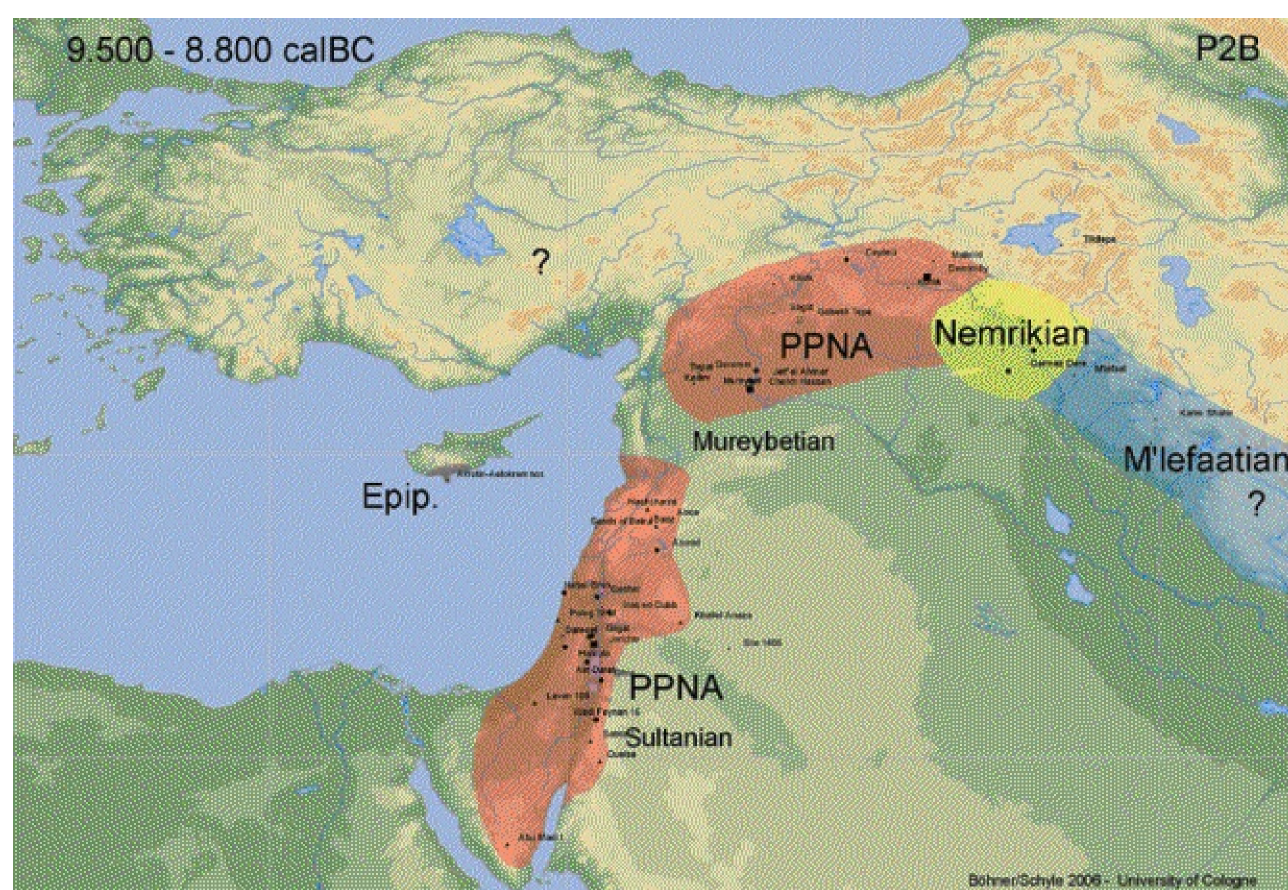
In the foothills of the Zagros, too, settlements at this time consisted of clusters of oval, semi-subterranean dwellings, the superstructures being supported by plaster and stone pillars. Although

there have been few studies of seasons of occupation, the assumption is that many of the major settlements were now permanent. PPNA sites have good storage facilities, necessary for the preservation of grain, as well as hearths and well developed grinding facilities including querns, bowls and bedrock basins. Trade with Anatolia (abundant obsidian) and the Mediterranean and Red Seas (shells) is also evidenced and represents continued participation in interregional trading networks in commodities that were not necessities.

Burials are common in Jericho, Netiv Hagdud, and Iraq ed-Dubb, but are missing, surprisingly, from Gilgal, where large surfaces were excavated. A possible explanation is that Gilgal had an entirely different function and was used only as a seasonal camp in the same way supposed for several Natufian sites in the lower Jordan valley. The removal of skulls from adult burials was a common habit, suggesting a cult of the ancestors. In contrast, skeletons of children remained intact.

PPNA lithic technology was similar to Natufian in the use of microlithic tools, presumably characterized by single-platform blade cores and retouched pieces including points, sickle blades or large blades, and overwhelming numbers of small blades shaped into burins and perforators. Other forms are lunates, retouched bladelets, and adzes, which have a working edge shaped by transverse removals. Polished celts, made either of limestone or basalt, were possibly exchanged between sites in different regions.

The few small art objects found at PPNA sites are often female figurines, generally depicting a seated woman with eyes, breasts, and, rarely, incisions on the head that can be interpreted as symbolizing headgear. These figurines mark a clear departure from those of the Natufian, at which time depictions were dominated by animals and humans which were genderless.



Settlement pattern of the earliest foragers-farmers in the Fertile Crescent

mainly hunting equipment, but there were many more heavy-duty tools such as picks, adzes, and planes, more blade tools (including many sickles), and a wide variety of grinding equipment. Querns and hand-stones gradually replaced mortars and pestles, as people came to rely more and more on cereals. Cooking was done by households, the main method involving heated stones on the cobbled floors of hearths. A variety of cordage from basketry and nets has also survived. The lithic industry documented in the Jordan valley sites is

The subsistence system is still imperfectly known, but most observers are willing to concede that cultivation begins here with intensive hunting and possibly some keeping of animals; although the faunal assemblages from PPNA sites generally contain few remains of domesticated taxa like sheep, goats and cattle. Hunting was important, especially of gazelle. Wild fruits and seeds were gathered as well. Silos were found at many sites, either as small stone-built bins or larger builtup mud-brick structures. Lizards and tortoises were gathered as well. The overall picture is that of a 'broad spectrum' similar to that of the Natufian foragers (see Chapter II.3).

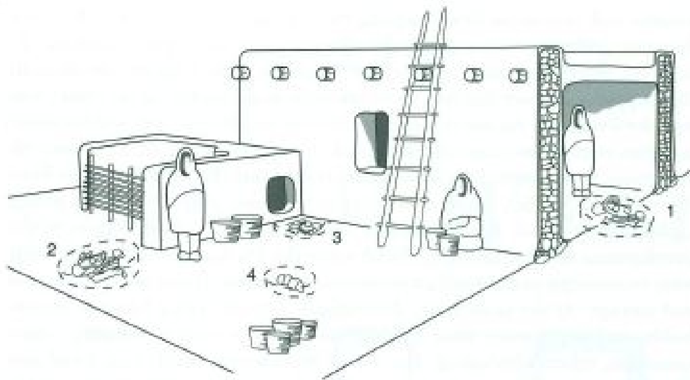
Experimental work by Hillman et al (40) suggests that, under regimes of annual sowing and sickle harvesting, wild einkorn could have acquired the morphological characteristics of domesticated einkorn within a remarkably short period: they arrived at minimum and maximum figures of 20 and 200 years. However, if some people harvested wild cereals simply by knocking the heads into baskets (a practice widely attested ethnographically), and also if early tillage practices allowed intermixing between husbanded plants and wild plants (for example, early cultivators might have weeded only the more accessible parts of cereal stands, or transported seeds from natural stands to crudely prepared patches of soil near by), the process of change could have been far more protracted. One of the problems with the interpretation of PPNA subsistence behavior, therefore, is
Bokonyi (41) argued that the goats at Asiab, in the same zone, were also domestic, on the grounds that most of the sample consisted of male mature animals, and that there were examples of horn cores beginning to show the signs of flattening of the domestic goat's horn. On this evidence he postulated that people here were practicing 'protoherding', taking adult animals in order to try to capture their young to tame them.

Intentionalcultivationseemstohave marked the most significant departure in subsistence strategy from the Epi-paleolithic (Chapter II.3). A large array of seed and fruit remains has been recovered from PPNA sites, but tubers and leaves are either poorly represented or rarely preserved. Detailed or preliminary reports are available from various sites and enable us to make a tentative reconstruction of the vegetal diet. It is still not clear whether the shift from systematic gathering to cultivation occurred simultaneously in different geo

that whether a plant is morphologi cally wild or domestic almost cer tainly cannot be taken as a simple guide to whether it was husbanded in some way or just harvested. The indications are that most PPNA people lived by harvesting wild ce reals, gathering nuts and fruits, hunting gazelle and other ungu lates, fishing, and trapping small

mammals and birds. Some of them, however, in addition to such foraging, were also beginning to cultivate cereals and pulses on patches of alluvial soil beside their settlements.

Whether herding was also


Fig. 4.13. Schematic representation of PPNB residential architecture and mortuary practices, including: (1) primary adult burial, skull removed, subfloor, and inside of structure; (2) primary adult burial, complete, extramural; (3) primary child burial, complete, under wall of structure; and (4) secondary burial cache of three skulls (after Kuijt and Goring-Morris, 2002: fig. 8)

a significant factor in sustaining **Schematic representation of PPNB residential architecture and mortuary prac**these settlements remains unclear.
The principal animal eaten at most
PPNA sites was still gazelle. The
increasing variety in PPNA faunas of smaller animals such as fox and hare, and waterfowl, along with the larger game such as cattle, fallow deer, red deer, roe deer, and pig, might be an indication of hunting stress. The weight of the evidence suggests that Levantine PPNA people were hunters rather than herders though the small size of the goats at Wadi Fayun and the equal numbers of mature and immature animals may be evidence for a domesticated herd.

In the Zagros region of Iraq and Iran, though the evidence is generally dated, the picture appears to consist of greater and lesser degrees of sedentism but in either case sustained by foraging. The onset of Holocene conditions enabled people to expand out of the piedmont or foothills both onto the northern steppes and to higher elevations in the mountains, but there is little or no evidence of cultivation or herding. Domesticated barley has been reported from Ganj Dareh, though it may be later.

tices
graphical locations, as suggested in the past, or in one center, as proposed by Zohary (21).

Pre-Pottery Neolithic B (PPNB) Farming Communities: *ca.* 8500-6500 BC: About a thousand years into the Holocene there was a veritable explosion in agricultural settlement throughout South-West Asia and beyond to the west and the east. Communities based on mixed farming can now be identified from Cyprus, south-central Anatolia, and the Levant eastwards across the Zagros and possibly onto the hilly slopes of the Iranian plateau all around. This ‘culture’ of mixed agriculture (seed agriculture

plus animal herding) is usually identified in the Levant as the PPNB. Most of these sites are 2-12 hectares in size, the larger sites usually being 'tells', mounds of debris composed especially of collapsed dwellings made of mud and mud brick. The best-known larger settlements, with populations of perhaps 1,000-2,000 people, include: Tell es-Sultan at Jericho, Beidha and 'Ain Ghazal in the southern Levant; El Kowm, Bouqras, and the reoccupied Tell Abu Hureyra in the northern Levant; Cayanu Tepesi, Hasilar, and Catalhoyu in Anatolia (Turkey); and Maghzaliyah and Nemrik in Iraq. The principal new characteristic in the composition of these settlements was the construction of substantial square or rectangular dwellings, often with stone foundations and walls made either of *tauf* or *pise* (mud on a withy frame, baked in the sun) or mudbrick. Storage pits, silos, and hearths are common, invariably within the house. It seems certain that the household was now the primary unit of production and consumption.

The origins of the PPNB in the southern and central Levant are somewhat obscure. Unlike the PPNA, which is thought from radiocarbon dates to have begun in the central Levant, the PPNB may have started in the northern Levant, specifically northern Syria, and southeast Turkey, and diffused to the south and west into Anatolia. Thus, it is not a linear story of the feeble and hesitant steps of the Natufians (Chapter II.3) to the Pre-Pottery Neolithic A, to the Pre-Pottery Neolithic B, to agricultural villages on the hilly flanks of the Fertile Crescent, to the dispersal of these seed bearing people in Europe and the regions to the East. The evidence only shows a patchwork of these developments, sometimes the Southern and central Levant in the lead, sometimes the northern, and oftentimes the Levant is overshadowed by the areas far away from the Levant, in the nooks and corners of the Taurus mountains of Anatolia and the Zagros mountains of western Iran.

The most dramatic changes that occurred in the PPNB were rectangular structures, some with internal partitioning and plaster flooring. Two-floor buildings occurred for the first time. New types of lithic reduction strategy were also introduced at this time. The main changes are summarized as follows:

PPNB Dwellings: The very first rectangular buildings, some of which internally partitioned, occurred in this period although small oval and circular structures were still the preferred form in the desert and other marginal zones. Many had plaster floors, and usually had foundations of stone with superstructures of wattle and daub. The first occurrences of community structures, all slightly different, also appear at this time. A rectangular mud brick shrine from Jericho, a circular structure from Ain Ghazal and a rectangular stone-walled building at Nevali Cori all date to this period.These changes in design from houses in the preceding Natufian and PPNA periods suggest to Bar-Yosef and Meadow that there were significant changes in social organization, particularly at the bigger sites (42).

The floors were often plastered with a mortar made by mixing burnt and pounded limestone with water, especially of buildings that seem likely to have been of higher status. This is constructed basically of white limestone cobbles and pebbles set in concrete and varies from 5 to 20 cm in thickness. The limestone was evidently crushed for this purpose. A surface layer of primarily salmon pink pebbles 1-3 cm in diameter was set into the concrete while still wet, as were at least two sets of parallel strips of white pebbles, to make white bands 5 cm wide and over 4 m long. After the concrete had bonded, the entire surface of the floor was ground smooth and polished. Not only was the bond strong enough to support this grinding, but the concrete has remained extremely hard for over 8500 years (43).

PPNB Agriculture and Subsistence: By 8000 BC, PPNB affinities appear at sites outside the Levant, including Ganj Dareh, Tepe Guran and Ali Kosh in Iran. There is no evidence of the spread of agriculture into Zagros before this time. Farming communities had expanded, increasing both population numbers and the amount of land under cultivation. Most of the larger sites are in the Levantine corridor or in south-central Anatolia, in valleys and basins. How this process of agricultural expansion happened is unclear: existing hunter-gatherer communities may have adopted the new techniques from neighbors, or agricultural communities may themselves have spread into new areas as populations began to expand. Anatolia became increasingly important at this time, with the establishment of major sites like Cayonu and Catal Huyuk. Again, it is not known how agriculture was established in Anatolia during the PPNB – whether it was colonized or whether Anatolian inhabitants adopted the Levantine economic practices for themselves: the debate concerning the first southeast Anatolian PPNB farmers were of Levantine descent is still open (42).

It is in this period that an economy based on crop growing and animal rearing became important for human subsistence. Climatic conditions were probably favorable to this change: During the PPNB, the southern Levant would have experienced substantial summer rainfall, in addition to rain in winter, followed by a trend of warming and aridification in the post-PPNB, characterized by rainy winters and dry, hot summers (42).

Bellwood (44) summarizes the situation in the PPNB after 8000 BC as follows:
• regional episodes of resource shortfall due to land

degradation,
• Increased importance of domestic animals,
• Increased importance of legumes,
• Increasing specialization of sheep and goat pastoralism.

Over 18 sites contain plant remains in the Near East (32) including western Turkey and southwestern Iran. The following summarizes the distribution of the main cereal crops over time:
• By 7000 BC - 2-row barley was the most widely

distributed cereal, extending from southern Jordan to Western Turkey and southwestern Iran, and was domesticated by ca. 7000 BC.

• Also by 7000 BC - emmer and einkorn were spread over much of the area – emmer wheat was quite widespread but einkorn wheat was less so, appearing only at sites which also featured emmer.
• In the first half of the 6^{thth} row barley appeared in Syria, Turkey and Iran and free-threshing (probably hard) wheat in the Levant and Turkey.

At the important site of Beidha in Jordan there is evidence for the cultivation of barley and some wheat, along with pulses, especially lentil and vetch. In addition, the excavators there found evidence for thousands of pistachio nuts: on the floor of a "...burnt house some five gallons of carbonized pistachio were found, obviously once contained in some kind of basket..." (45). There were also acorns and they, along with the pistachios, convey the important role that gathering still played in the earliest phases of farming. At Tell Ramad there is evidence for the cultivation of barley and three different kinds of wheat (emmer, einkorn and club wheat), all on their way to full domestication, along with lentils and wild grasses. Rye was native to western Turkey and Abu Hureyra in the northern Euphrates but not elsewhere. Lentils were ubiquitous. Pea had a wider distribution than

before, from Jericho to Ganj Dareh. Bitter vetch and chickpea were restricted to the Levant and Turkey. Broad bean is known only from one site in northern Israel. Flax was widespread, probably first domesticated at Jericho. It was well preserved in the form of woven linen at Nahal Hemar Cave in southern Jordan, 6,900-6,500 BC. Of the available fruit and nuts, pistachios were most common followed by fig, almond, capers and grapes.

The principal PPNB settlements are invariably situated in low-lying locations by a good water supply and near moisture-retentive alluvial soils. Though people certainly collected fruits and nuts, hunted, and ate the meat of their herds, the skeletal studies indicate that their diet was heavily dominated by roughly ground cereals. Sickles, often heavier-duty compared with Natufian and PPNA examples, were used to harvest ripe or dry cereals, which was now possible because of their tough rachises. The botanical record demonstrates the rapid appearance of a wide range of morphologically domestic crops. There is widespread evidence that PPNB farmers were not just cultivating the so-called 'founder crops' (einkorn, emmer, two-row barley) but also naked six-row barley, free-threshing bread and hard wheats, a variety of pulses (lentil, vetch, pea, chickpea), and flax.

Beginning of animal husbandry is somewhat confusing in PPNB: in all appearance it was rather late in coming. In the Levant wild goat began to replace gazelle in human contexts by the middle PPNB, with sheep not found at these sites but appearing later in the southern Levant from about 6500 BC at the sites of Ghoraife, probably introduced from the north into the south. It is by no means certain if goat was introduced from the north, like sheep, or if it represents an autochthonous domestication of the local wild population. Although goat replaced gazelle as food before the appearance of sheep, it seems that sheep was eventually the most dominant animal in herds, at least in the southern Levant, which would be consistent with the character of each specie (sheep are easier to herd). Cattle appear in Mureybet in earlier periods. At Cayonu in southeast Turkey the early Phase 1 was dominated by pig, cattle, deer, some sheep and particularly goat. Late Phase was overwhelmingly dominated by goats and sheep.

The first widespread evidence for herding sheep and goats in the Zagros and Taurus regions is found at the beginning of the PPNB, earlier than in the Levant. Evidence for goat herding in the mortality structures at Ganj Dareh (Iran) coincides with morphological changes (flattened horn cores) and caprine footprints preserved in mud brick, indicating that tamed goats were being kept on site. There are similar flock structures at Ali Kosh (Iran) in the second phase of the settlement. The use of tamed sheep and goats seems to have developed extremely rapidly, with reliable evidence at sites such as Catalhoyuk, Jericho, 'Ain Ghazal, and Beidha. This chronological evidence shows that the spread of the domesticated goat was from East to West.

It appears that the earlier part of the PPNB was characterized by the 'fitting together' of the various components of the cereal, legume, sheep, and goat mix. Both sheep and goats needed a wider range of food than gazelle (sheep need grazing, goats prefer browse), and more water. The locations of the PPNB settlements were poorly suited to the needs of gazelle and better placed for those of sheep and goats in terms of food (both natural and cultivated) and water.

The fact that sheep, goats, cereals, and legumes often appear together in the Levant suggests that what were now increasingly sedentary communities were realizing the benefits of husbanding these resources together. Putting sheep and goats onto cereal stubble after the harvest was good for the animals (food) and good for the ground (manure), and once people started using straw for livestock

bedding and feed, they would have been producing rotted manure to put back on the fields. Neolithic mixed farming may also have involved the systematic use of burning of rangeland beyond the arable fields to regulate vegetation structure and composition to improve livestock grazing.

Bar-Yosef and Meadow (46) offer the following model: Goat domestication took place during the early 9th millennia B.C., followed by sheep in the first quarter of the 9th millennium B.C. followed by cattle at the end of the PPNB after 7500 B.C. and pig at some stage in the late PPNB. However, although they believe that sheep was probably domesticated in the Zagros-Taurus regions, they see no clear area of domestication for goats, which makes any attempt to establish a chronology for domestication somewhat open.

Garrard et al (47) suggest the following summary based on previous studies:
Goat:
• *ca.*7000 BC – the first evidence for goat management at Ganj Dareh (Iran)

• *ca.*7200-6500 BC (mid PPNB) – change of preference from gazelle to goat at Jericho (Jordan) and ‘Ain Ghazal (near Amman), and possibly at Beidha
• *ca.* 6500-6000 BC (late PPNB) – extension of goat exploitation in the Levant at Abu gosh, Beisamoun and Atlit (northern Israel)
• *ca.* 6300 BC – conspicuous change in preference from gazelle to goat at Abu Hureyra (northern Euphrates)

Sheep:

• Possibly at seventh millennium BC sites in southern Turkey
• After 6500 BC - increased use of wild species in northern and southern Levant, increasing in numbers over the next 200-300 years
• *ca.* 6300 BC (late PPNB) - significant increase in use of sheep in both southern Jordan and at Abu Hureyra (northern Euphrates)
• After 6000 BC – abundant at ‘Ain Ghazal, Horwitz (48) says that it is unknown if domesticated goats were an import, or whether they were an autochthonous development in one or several areas in the Southern Levant. Garrard (49) suggests that goat may have been domesticated in several different locations at more or less at the same time within the Levantine area, and that sheep came later, probably being domesticated first within the Fertile Crescent: “there is clear evidence of domestic sheep into the central and southern Levant in the middle and late seventh millennium BC” (49). Martin and Garrard propose that domesticated sheep are an import into the Levant from the north, complementing existing cultivation strategies and the domestication of the goat: “All researchers agree that sheep were introduced into the southern Levant from the north, with earliest domesticated sheep found 5500 BC in the Damascus Basin” (47). Such views are rather limited, ignoring the evidence from other areas, such as Central Asia and Baluchistan. For example, there is evidence

from Mehrgarh that goats, sheep, and cattle were already domesticated in Baluchistan before 7000 BC. Given this evidence, would it not be more likely that the domesticated sheep, goats, and cattle were imports to the Levant and the Near East generally rather than an autochthonous development? The traditional view is that the domestic sheep *(Ovis aries)* is descended from the wild Urial or Asiatic mouflon sheep *Ovis orientalis,* which is found widely distributed all the way from the eastern Mediterranean to the edge of the Himalayas; and that the domestic goat *(Capra hircus)* is descended from the wild bezoar goat *Capra hircus aegagrus,* which is distributed from Turkey south-east down the Zagros to Baluchistan and beyond the Caspian Sea into Central Asia. Wild cattle or aurochs *(Bos primigenius),* the ancestor of both the European domestic *Bos taurus* and the Indus humped or zebu cow *Bos indicus,* was distributed in the Pleistocene right across Eurasia from the Atlantic to the Pacific, as was the wild pig, the ancestor of the domestic pig. Thus, domestication of these animals could have happened anywhere, not necessarily in SouthWest Asia. In fact, indications are that goat, sheep, and probably cattle, were not domesticated in South-West Asia but rather diffused from outside the area in the already already domesticated form. In this connection, another factor should also be considered. While there is some evidence in some regions, such as Afghanistan, for domested goats and sheep but no agriculture, there is no such evidence in South-West asia.

A kind of bottom line on the PPNB subsistence regime is that it was mixed; these people were real farmers, who kept domesticated animals, at least the small ones. But, they were also sophisticated in their hunting and gathering. Some sites seem to indicate that this provided an important part of the diet, which probably means that there was a marked degree of regional specialization and differentiation among the peoples of the PPNB. It also probably indicates that when things got tough for them, whether from drought, plagues of locusts, or whatever, they were able to fall back on their hunting and gathering skills with considerable facility to ensure their survival. PPNB remains also display a remarkable degree of cultural cohesion, being recognizable from southern Turkey south to Sinai and all the way to the Elburz slopes.

PPNB Lithic Technology: Along with subsistence practices, the lithic technology also demonstrates increasing efficiency through the use of bipolar-flaked cores and pressure flaking, to produce standardized blades that were then fashioned into equipment for hunting (geometric microliths, tanged arrowheads), harvesting (sickle blades), heavy wood-working (axes), finer carpentry, leatherworking, and other craft production (burins, scrapers, borers, and so on). Querns and hand-stones were produced in large quantities.

PPNB Interaction - Trade and Exchange: The development of a mixed agricultural system had huge implications for PPNB demography, economy, social behavior, and ideologies (30). Regional surveys indicate that, wherever the agricultural system could be practiced, populations grew dramatically through the PPNB period. Existing settlements got larger, new settlements budded off, and many of the major settlements developed as foci of exchange and ritual. Increasing standardization in artifacts points to the beginnings of craft specialization, with its implications of particular households having the surplus food to maintain the craftsperson, or being able to acquire such food from other households in return for goods. We know little of such exchange systems

operating at the local level, between households and neighboring communities, but there is much evidence for expanding systems of regional and interregional exchange, the best archaeological signatures of this being the black volcanic glass obsidian, found at settlements in the Levant and Zagros hundreds of kilometres from its sources in eastern Turkey. Other indicators of such exchange are marine shells from the Mediterranean and Red Sea and lumps of copper (surface nuggets, or 'native' copper) from the Negev and southern Jordan turning up at settlements far from the point of origin.

The spread of both cultivars and plant growing and processing techniques over a wide area in a fairly short period of time is in itself a good indicator for extensive communication networks: “the rapid spread of cultivars during the late eighth and early seventh millennia BC supports the notion that there were extensive exchange and information networks across Southwest Asia during the PPNB” (49). There are some signs of trade or exchange between farming and hunter-gathering communities, which may indicate reciprocity during times of stress, or simply mutual taking advantage of the skills and products produced by each type of lifestyle. Anatolian and Syrian sites seem to have had a connection, marked by incised stone pebbles, which they share in common. Plastered skulls, which were characteristic of the PPNA occurred in Anatolia as far west as Hacilar. Bellwood (44) summarizes: “We might argue for ever about how many ethnic groups constituted the PPNB, but one thing is clear – they communicated efficiently”. *PPNB Burials and Religion:* Some very specific and formal traditions were established at this time, and represent a significant change from previous traditions. Burials were common, particularly at the bigger sites like Catal Huyuk. In many cases the head had been removed, particularly in the Levantine PPNB. In some cases skulls had been modeled in plaster, sometimes with shells replacing the eyes – represented at sites like Jericho, Ain Ghazal, Basta, Kafar Hahoresh, Beisamoun, Nahal Hamer, and Tell Ramad. This may represent an ancestor cult. Skulls are found in various contexts which are not funerary, ceremonial or religious – house, floors, pits etc. Communal burials are another feature which becomes conspicuous in the PPNB. At Cayonu 400 individuals were represented by mixed remains in stone cists, covered by slabs, at the end of a building. At Ba’ja in Jordan secondary burials were found in a chamber which had been plastered and then painted. At Kfar Hahoresh, near the Sea of Galilee, wild cattle burials were made in pits sealed with plaster.

PPNB Art and Craft: This period is particularly known for painted plaster statues – usually either female or genderless. An important cache of the statuettes and small statues were found at ‘Ain Ghazal in central Jordan during the 1983 excavation on the northeastern outskirts of Amman, and has been analyzed by UCL’s “’Ain Ghazal Statue Project”. The site of ‘Ain Ghazal was established in 7250 BC in the mid PPNB, and was abandoned at around 5000 BC. The cache was found in a pit in a cluster of buildings, and the statuettes fall into two types: small versions ca. 35 cm and larger ones ca. 90 cm, labeled respectively “Dumpies” and “Figures”. The statuettes were made by modeling plaster formed of lime, quartz and crushed calcerous filler, sculpted around a frame made of reed, strengthened using spun twine. The Dumpie cores were much simpler than those of the larger Figures. Evidence from the pit in which they were found suggests that the reeds extended through the feet of the statues, perhaps so that they could have been inserted into the ground so that figures were held upright. Some statues were decorated with pigments made from ochres, carbon and white lime. Small animal and human figurines were also made in clay and occasionally limestone or bone. Female figurines are most frequent, unlike the animal art of the Natufian. An eyeliner was made of a bitumen substance and sometimes elaborated with green depots.

The preparation of plaster was an important technological innovation which represents the beginnings of pyrotechnology, bringing fire out of the family hearth and into the spheres of technology and industry. The next stage was pottery making, expanding human control over heat and

other material skills. In fact, PPNB sites have evidence for experiments with the manufacture of containers from plaster, as humans were searching for ways to solve the container problem, without resorting to the time consuming pursuits of basket making and carving. Plaster was also used for the preparation of "portrait heads". The foundation for these heads was a human skull, built up with plaster to represent the living face of a person. Some of them show great skill on the part of the sculptor, who occasionally used sea shells to represent the eyes. Twelve plastered skulls were found in PPNB levels at Tell Ramad in the Damascus suburbs and Ain Ghazal. Skulls modeled in asphalt were found in Nahal Hemar Cave and rather spectacular human figurines in plaster were found at Ain Ghazal (5).

A number of sites fragments of cordage and fragments of bitumen with basketry impressions at Abu Hureyra, for example, and the Nahal Hamar cave south-west of the Dead Sea contained desiccated remains of mats, baskets, vessels, nets, and quivers, as well as fragments of line. Through the course of the PPNB, some communities such as at Abu Hureyra also started to manufacture large vessels of gypsum and lime plaster.

PPNB Social Organization: Bellwood discusses the meaning of skull detachment and treatment (44), and extrapolates from the specifics of the actual meaning of this activity to more general comments about what this may indicated about social organization during the PPNB. He suggests that skull veneration “certainly indicates an increasing interest in ‘ancestors’, as does communal burial. The ethnographic record leaves no doubt that ancestors often correlate with the existence of lineages. In turn, lineages often correlated with conhave also produced basketry: there were cepts of ownership of defined pieces of food producing land” (44). He brings into the discussion questions of rights of access.

It is possible that in the event of any emphasis at this time on the concept of land ownership, there could well have been tensions between cultivators and hunters, the latter possibly finding themselves denied access to lands which had formed part of their seasonal routine for many generations. The increasing size of settlements at this


Shanidar Cave in Iraq

time, equating perhaps to small towns, would have given the inhabitants the opportunity to seek partners from the settlement population, becoming for the very first time “settlement-endogamous”. This sort of change in social arrangements would have marked a very different attitude to life – encouraging internalization, increasing identification of individuals and families with specific settlements and the land that they worked, building up extended families in relatively closely defined areas. The growth of settlements in the PPNB could have had very considerable impacts on the individuals living in them and both their beliefs and their interactions with those they were close to and distant from.

Flannery (50) suggests that the change from circular to rectilinear structures as a change of some social significance, reflecting a move from a “compound” to a “village” mentality, and this may in

turn reflect, he suggests, a move towards social organization in terms of the so-called nucleated family.

The socioeconomic changes expressed in the very early Neolithic, some 8,000 years ago, led also to major shifts in kind and division of labor, social organization, and exchange patterns.The success of this revolution was supported by the wetter, stable climatic conditions and ensured the survival of farming communities along the Levantine Corridor. The success of these communities led to rapid population increase, as is revealed by the number of PPNB sites and the spread of the suite of cultivated plants into neighboring areas and the rest of the Near East, which until then had been continuously occupied by groups of hunter-gatherers.

In summary, most authorities agree that early Neolithic communities in the Near East subsisted on cereals, legumes, and wild seeds and fruits, as well as on mammals, reptiles birds, and fish obtained through hunting, trapping, and fishing (46). The procurement strategy for each food type, however, was different. by communal game drives.

The Expansion of Agricultural Communities in South-West Asia: Compared to the ‘origins’ of agriculture, vey little work has been done to seek the answers to the questions that relate to the spread of agriculture and expansion of the agricultural communities. Achieving a good understanding of the evolving complexity requires having not only well-preserved, excavated, reported sites but also good control over chronology. Such chronology unfortunately does not exist. Chronological tables, no doubt, have been constructed but each one differs from the other. In this situation, it is rather fruitless to dissect each and every minutia in order to uphold the primacy of the Near East as our conventional wisdom calls for. No doubt, “very soon we will be able to calibrate all radiocarbon dates for this period and tie them to the historical chronology. This development will help us to better define existing gaps and their time lengths and should serve to encourage researchers to increase the number of samples run and published”, but at the present time we are not there.

In spite of chronological uncertainties, the growth of agricultural villages and the budding off of new communities is archaeologically visible during the eighth millennium B.C. and becomes clearer by the end of the seventh millennium. Several sites have longer sequences than others even when the dates indicate rapid accumulations due to the use of mud bricks or wattle and daub. Chronological gaps in the archaeological sequences of well-established settlements can be interpreted as resulting from shifting cultivation, soil exhaustion, or salination, although in some cases it is not clear that the settlement was entirely abandoned rather than shifted to a new location nearby. The following brief descriptions of a few agricultural sites and regions would give us a flavor of these post-PPNB changes and help us to draw a generalized picture.

Beyond the Levant: A Multifocus Agricultural Origins: So far we have primarily dwelt on the Levant as a single ‘core area’ for the origins of agriculture. A whole generation of archaeological and genetic results seemed to support this concept. Ge

**Figure from Ain Ghazal**

netic studies have particularly supported this hypothesis of single point domestication and rapid dispersal. However, the accumulation of recent evidence and refinements in methods undermine this concept, pointing increasingly towards multiple geographical origins and protracted dissemination. Dorian Fuller et al (228) stress that it is important to recognize that modern germplasm collections are

A scene depicting a red-deer hunt, painted on the antechamber wall of a hunting shrine found in level II of Catal Huyuk dating from about 5800 BC.



Stone knife from Catal Huyuk

an imperfect sample of the diversity of wild and cultivated populations of the past, which included some extinct lineages. They synthesize the accumulated data from archaeobotany, defending the reliability of archaeological science to inform us about the past plant populations used by people. These data indicate an extended period of predomestication cultivation of at least a millennium and the slow evolution of morphological domestication adaptations in crop plants. Accordingly, the appearance of early cultivars and domesticates was spread piecemeal around the Near East, and a whole crop package is not evident. The ‘core area’ claimed by some authors has no better claim for primacy or completeness in comparison to other parts of the Near East. Evidence from zooarchaeology similarly points towards a diffuse appearance of various domesticated animals. The ‘non-centric’ appearance of domesticates from the Near East is therefore similar to the emerging evidence from many other regions of the world where plants were domesticated. Graeme Barker (25) picks up this theme and surveys the region for other possible centers of domestication, noted below.

Beyond the Levantine corridor, we do not have anything that matches the concentration of excavation and research that has taken place in the southern Levant over more than 70 years. In the caves west of Anatolya on the south coast of Turkey, excavations do show that there is a long stratigraphic sequence through the Epi-paleolithic, and into the early Neolithic, but they are not yet fully explored or documented. In the piedmont and intermontane valleys of northeast Iraq and western Iran, cave sites have been investigated here and there, although no field-work has been possible since the 1960s. These soundings show that there was an Epi-paleolithic presence, following upon Middle and Upper Paleolithic occupations, but that there was a break at the



Female statuette, Samarra, *ca.* 5500 BC (late Mesopotamian period)



The vessel above is a hand-built product of the Halafian potters at Arpachiyah (Iraq) whose skillfully fired ceramics
far surpassed the later wheel-made pottery of Babylonia, *ca.* 5000 BC

height of the Last Glacial Maximum, when the Zagros region was abandoned. The pollen evidence from a core taken from the bed of Lake Zebra, in an intermontane valley of the Zagros Mountains, shows that winter conditions were much colder than today, and woodland and other vegetation was much reduced. As stated earlier, the Epi-paleolithic culture in the Zagros region has been named the Zarzian, taking its name from a rockshelter called Zarzi, one of several sites in Iraqi Kurdistan that were briefly investigated by the intrepid Dorothy Garrod early in the 20th century.

Two sites excavated in the 1950s in the remote mountains of Northeast Iraq, Shanidar Cave and the nearby open village site of Zawi Chemi, are tantalizing pointers to the presence of sedentary hunter-gatherer communities depending on stored harvests and a broad-spectrum hunting strategy in the last millennium of the Epi-paleolithic. The final Epi-paleolithic stratum in Shanidar Cave, unlike earlier levels, produced ground-stone implements, small mammal bones, fish and shellfish, cobbled stone floors, and a number of burials. The small

**A collection of ground stone tools found in the PPNB water-well at a Syrian site**

open village site of Zawi Chemi gave evidence of a sequence of circular, stone-built houses, burials within the settlement, and the use of personal orrnament. More than 200 ground-stone implements were recorded, indicating the intensive processing of hard seeds such as grasses, cereals, or pulses. The animal bones from this Late Epi-paleolithic settlement showed the intensive exploitation of wild sheep in a way that was different from earlier practice, with many more young animals eaten, though the claim that these were sheep on their way to domestication is not now generally accepted.

The Younger Dryas forced trees back into the refugia they had occupied in the Late Glacial. Surveys of the northern steppes around the headwaters of the Euphrates and Tigris valleys indicate regions devoid of significant settlement at this time, and the higher mountain valleys of the Zagros also seem to have been abandoned. In the main zone where settlement concentrated, the foothills of the Zagros, there are signs of greater investment at living sites in sheltered locations. Small-scale structures were constructed within caves and on platforms outside them, stone foundations for simple round or oval shelters. The fauna at these sites consist predominantly of sheep and goats, both morphologically wild. Perkins argued that the sheep at Zawi Chemi Shanidar were being herded, because the site had more sheep, and more immature sheep, than at Zarzian Shanidar near by, but his theory has found little support: as with gazelle, the same mortalities could have been produced by communal game drives.

Catal Huyuk: In 1958, James Mellaart discovered an Anatolian settlement at Catal Huyuk, situated on a small river 48 kilometers (30 miles) southeast of modern-day Konya. Catal Huyuk covers an area of 13 hectares (32 acres) and is three times the size of Pre-pottery Jericho. A flourishing township by

6000 BC, it consisted of brick houses arranged sid-by-side like a honeycomb.The most unusual feature of these houses is their highly standardized plan, each occupying some 25 square meters (30 square yards) of floor space. Access must have been by means of a wooden ladder from the courtyard onto a flat roof, and from there through a shaft and, finally, a low doorway. The living rooms had built-in benches and platforms, as well as hearths and ovens, all made of earth and plaster.

The extraordinary standardization of the estimated 1,000 houses, accommodating a population of 5,000 to 6,000, suggests deliberate planning and a high level of cohesion and cooperation within the community. Of particular interest are groups of rooms, each with a storeroom. The elaborate murals and other contents of these rooms strongly indicate that organized ritual activities took place here.The paintings on the carefully plastered walls depict hunting scenes or women giving birth, or consist of numerous geometric patterns. The shrines also contain groups of human and animal figures chipped from stone or modeled in clay. There are groups or rows of bull's-horn cores set in benches or in stylized bull's heads. The rites performed in the shrines, undoubtedly concerned with fertility, seem to form a link with the Upper Paleolithic period, on the one hand, and with the Bronze Age (for example, Early Minoan Crete) on the other.


Late period Ubaid pottery from Tel al Ubaid (British Museum**)**

Catal Huyuk's wealth was founded on agriculture and trade. Evidence of cattle breeding is found in the earliest excavation levels - the first evidence of unquestionably domesticated cattle known in western Asia.

ThearchaeologicalevidencefromCatalHuyuk is fascinating in many respects. Neolithic villages in Southwest Asia do not appear to have had cemeteries or elaborate tombs comparable with those of the same period in western Europe. In early Jericho, for instance, the dead were buried under house floors, with their heads buried separately. At Catal Huyuk, the corpses were placed beneath sleeping platforms. Wall-paintings in three of the shrines show vultures together with headless human figures, the figures often lying curled on their left side. Mellaart (51) has interpreted these scenes as depicting part of the burial process, and a considerable amount of evidence supports this view. For instance, many of the bodies buried beneath the house floors were lying on their left side; human skulls were found on house floors separated from bodies; flesh was removed from bodies before burial - perhaps by vultures.

Undecorated pottery vessels were in general use, and well-preserved prototypes in wood or basketwork have survived, along with equally well- preserved fragments of woven fabrics. The wooden vessels show a variety of form, a mastery of tech- nique, and a sophistication in taste that is

unpara- lleled in the Neolithic period elsewhere in this area.

Among the specialized crafts of Catal, the chipped stone items, exemplified by a number of ceremonial weapons and ground and polished obsidian mirrors, are by far the most elegant in Southwest Asia. High-quality woolen textiles, in a variety of weaves, were also produced. Clearly, the crafting of specialized and even luxury items from certain materials was an important feature of Catal's economy. The fact that many essential raw materials had to be brought from elsewhere points to a commercial basis for much of the community's wealth. The unusual size of Catal itself strongly suggests that its people exercised some form of political control over the surrounding region.

The site appears to have been occupied from some time late in the seventh millennium BC until the latter part of the sixth millennium BC, when, for unknown reasons, it was abandoned. The reasons why an advanced, though isolated, settlement such as Catal Huyuk came to nothing in terms of further social and economic development remain obscure.

Early Settlement in Sumer: It is only from a relatively late stage that there is archaeological evidence of settlement in the arid southern plains of Mesopotamia. The Ubaid culture, which extended from 5000 BC to 3750 BC, is generally thought to be the earliest manifestation of settled farming in the southern floodplains The earliest phase, known as 'Ubaid 1, or Eridu, was very limited geographically, but these settlers from the south soon moved up the Tigris and Euphrates rivers in search of new land. At this point, Mesopotamia became the center of civilized Southwest Asia - the place where the foundatio**ns** of the Sumerian civilization were laid. At Eridu, slightly west of the present-day course of the Euphrates, a series of small square rooms fitted with altars has been found in very early excavation levels in association with distinctive monochromepainted pottery. These buildings represent the beginnings in the south of the long and much elaborated tradition of Mesopotamian temple architecture.

Little is known about the early 'Ubaid economy, but it seems almost certain that the 'Ubaid peoples' were irrigation farmers who harnessed the destructive spring floods of the Euphrates River to improve their crop yields.Certainly, there is evidence that settlements were becoming bigger. Eridu may have covered an area of 10 hectares (24 acres) in the later Ubaid periods, with as many as 4,000 inhabitants. Populations of this size must have increased the need for some form of centralized control, but evidence of social stratification, such as differences in grave goods or in houses, is extremely limited

A number of technological innovations took place in Ubaid times: copper casting; the use of fired bricks for building; and the use of simple sailboats for river transport. The fine-quality decorated pottery of the Halafian and Samarran cultures gave way to technologically improved but mass-produced wares, often crudely decorated. Some pottery was manufactured on the tournette, a forerunner of the fast-spinning potter's wheel. Engraved stamp seals depicted animals and humans together, whereas in the Halafian period they had borne only simple geometric figures.

While agriculture in southern Mesopotamia must have been extremely productive, it seems likely that wealth was increasingly based on mercantile trade during this period, and that command over the organization of commerce and the exaction of tributes would have been centered in the temples. Never before had a single culture been able to spread its influence over such a vast area. So widespread was this influence that the prosperous Ubaid culture, on the plains of Mesopotamia, provided the basis for the cultural explosion represented by the emergence of the later historic-and

first literatecivilizations.

Farming in Northern Syria: Two recently explored sites in northern Syria - Mureybet and Tell Abu Hureyra, on the banks of the Euphrates River, near the modern-day town of Aleppo - have yielded materials dated to the earliest period of farming, between 7600 BC and 6000 BC. Mureybet is of particular interest, being the earliest village site from which remains of a domesticated plant have been recovered, in the form of einkorn. Since in its wild state this variety of wheat grows far away, in the foothills of the Taurus and Zagros mountains, it must have been cultivated here. Abu Hureyra lies outside the area where wild cereals grow today, but between 9500 BC and 8000 BC, when the site was first occupied, the climate here was somewhat warmer and moister, and the village lay in a wellwooded steppe area, where animals and wild cereals were abundant.

The Hureyra people initially built a semipermanent settlement here and harvested wild cereals as part of Th.eir subsistence strategy. They also had access to a reliable source of meat in the form of the Persian gazelles that arrived from the south each spring. About 7600 BC, a new village rose on the site of the earlier settlement, extending over nearly 12 hectares (30 acres). At first, the inhabitants hunted gazelles intensively, but about 6500 Be, they switched to herding domestic sheep and goats and to growing pulses, einkorn, and other cereals. Their rectangular, single-storied, multi- roomed mud brick houses were linked by narrow lanes and courtyards and had black, burnished plaster floors, sometimes decorated with red designs. Each house was probably occupied by a single family.

Early Farming Villages in the Zagros Mountains: The earliest evidence of settlement in the Zagros Mountains is less substantial than that found in northern Syria, although there were semipermanent encampments in northern Iraq, such as those at Karim Shahir, Zawi Chemi, and Shanidar Cave, about 10,000 BC to 9000 BC. In the upper excavation levels of Zawi Chemi and Shanidar Cave, domesticated sheep account for 80 percent of the remains of the animals that were eaten, making this site the earliest known example of human control of food production in Southwest Asia.

The first of the early village-based farming communities to be discovered, and probably the best known, is Jarmo, situated in the Chemchemal Valley, east of Kirkut, in northeastern Iraq. It dates from the seventh millennium BC, but more precise dates are difficult to establish, because radiocarbon datings at this site are uncertain.

Lying at an elevation of 800 meters (2,600 feet), and covering an area of some 4 hectares (10 acres), Jarmo has archaeological deposits 7 meters (23 feet) deep. In the upper third of these, pottery is found in quantity for the first time. The economy was based on village-style agriculture, along with hunting and gathering. Two-row barley, wheat (einkorn and emmer), and several large-seeded annual legumes were cultivated, and sheep and goats were herded. The first certain evidence of domesticated pigs has also been found in these upper levels. This is of particular interest, because pigs, like dogs, eat the same range of foods as humans and are not adapted to the nomadic herding way of life. Braidwood is convinced that Jarmo flourished for about 300 years in the mid-seventh millennium BC. The site apparently never had more than 25 houses at anyone time, and had a population of 150 or so. The rectangular houses, each consisting of several small rooms and a courtyard, were built of molded mud. The clay walls were often built on a stone base, and clay floors were laid over beds of reeds. Storage bins and domed clay ovens were found, and it is thought that the latter may have been

used for drying grains. Tools of chipped stone were found in huge quantities, a high proportion of them of obsidian and flint. There was also a great number of ground stone objects, including marble bracelets and a variety of attractive stone bowls. The most remarkable artifacts from Jarmo are a striking quantity of lightly fired clay figurines, representing both animals and humans, plus a variety of other clay objects, such as stamps.The pottery, buff to orange in color, is mostly plain and handmade, although often burnished.

Braidwood and his team of natural scientists believed that the climate had been essentially stable during the period when animals and plants were domesticated, which would mean that Childe's Oasis Theory could be rejected. Through his work at Jarmo and other sites in the Zagros, Braidwood concluded that agriculture had arisen in Southwest Asia as a "logical outcome" of specialization and the elaboration of culture. The hunter-gatherers simply me "settled in" during the Holocene period, becoming intimately familiar with their plant and animal neighbors. As their culture evolved, people developed more efficient means of exploiting their environment, and agriculture thus formed a natural link in the long evolutionary chain. W h i l e Braidwood's work made a number of w o r t h w h i l e contributions to solving the problem of when, where, and why hunter-gatherers adopted a settled way of life, subsequent information accumulated from similar investigations throughout Southwest Asia has complicated as well as enriched our picture of the Neolithic period.

Developments in Western Iran: In the eastern part of the arc of the "hilly flanks" zone, the best-known region is in western Iran where several settlements of the aceramic Neolithic period have been recently found. In addition, they found that communities had moved out of the intermontane valleys onto the eastern edge of the alluvial plains of the major rivers that flow to the head of the Persian Gulf. With the passage of time, through the ceramic Neolithic and the following periods down to the Bronze Age, the number of village sites grew and grew. There was, however, a strict limit to such opportune locations in an area with annual rainfall insufficient to support dry farming. We must assume that, as the number of settlements began to grow, people were learning to manipulate groundwater resources and moving toward irrigation-based agriculture. The successful outcome of the American expeditions to Iraqi Kurdistan encouraged prehistorians from many countries, including Canada, Denmark, France, Japan and the United Kingdom as well as the United States, to extend exploration further east and south along the piedmont zone of the Zagros mountain range. Rich discoveries were made here but gaps are still to be filled before the process and chronology for the development of agriculture and herding can be deciphered in this part of the old world.

The villagers here harvested their cereals with flint sickles, which were set into wooden handles by means of asphalt. Grains were probably collected in the simple twined baskets found at this site. Wheat, barley, and seeds from wild herbs were ground on stone slabs in the shape of a saddle or a shallow basin, using simple disk-shaped handstones or pitted limestone. This use of a stone mortar for grinding was a notable innovation. External contacts seem to have increased in this phase, for obsidian had been brought from Anatolia and seashells possibly from the Arabian Gulf, while copper probably came from somewhere in Iran. Pottery appears in the next phase, about 6000 BC to 5500 BC, together with several types of artifacts similar to those found in Mesopotamia later in the sixth millennium BC, particularly at the site of Tell es-Sawan. The flint industries from the earliest villages included fluted cores and microliths, and it is significant that the latter, modified by changes of pattern, persisted into the fourth millennium B.C. On the other hand, the blades of sickles (or more correctly reaping knives) were already present in the earliest village levels. Analysis of organic traces from successive levels shows that subsistence underwent gradual but progressive changes. Whereas dry farming was at first subsidiary to hunting and gathering, it came in due course to replace these activities as the principle source of food. Again, the productivity of agriculture was greatly enhanced by the development of effective irrigation. By far the most important source of meat

during the dry farming phase was that furnished by caprines, in itself a sign of movement from the highlands to the steppe plains. Among the caprines sheep were markedly subsidiary to goats. The predominance of young males and the complete absence of old individuals among the caprines argues for some degree of domestication from the beginning, though signs of genetic change did not appear until the later phase. Gazelle and onager were fairly strongly represented to begin with, but their later and noteworthy decline argues against them having been domesticated. **Post-PPNB Life:** Although mixed farming was first established in the PPNB in South-West Asia, it was probably only in the post-PPNB Neolithic, from the later seventh millennium BC, that people really came to rely on agriculture across the region as a whole. The introduction of pottery coincided with important changes in the social context of agricultural practice, too. The finer fabrics could hold liquids, and soot on the earliest vessels at Abu Hureyra shows that they were certainly being used for cooking, enabling people now not just to roast meat on heated stones but also to mix flavors of meat, vegetables, and herbs in casserole-type dishes. With pottery, cereals could also be processed to make a range of softer, more digestible, foods - the teeth of the people at Abu Hureyra get far less abraded at the same time as pottery appears at the site. One of the most important activities that was greatly facilitated by being able to combine pottery and cereals was brewing, the magical process of fermentation presumably discovered as people observed that an old gruel left to stand did not spoil, but instead tasted sweet and had distinct effects on the mind and emotions. In many traditional non-Western societies, communal beer-making and drinking are associated with a variety of activities from clearing forest, preparing ground for cultivation, and large-scale construction tasks, to marriages, funerals, and other rites of passage. Beer certainly played an important role in the economy and ideology of the Sumerians, the first urban and literate societies of Mesopotamia, whose sign for 'beer' was made by drawing the sign for 'clay vessel' and filling the interior with linear markings.

Contemporary with the development of potting were changes in animal husbandry. Like sheep and goats, cattle and pigs seem to have been valued by PPNB farmers primarily for their meat. During the course of the Pottery Neolithic, however, Near Eastern farmers began to exploit the potential first of sheep and goats, and then of cattle, not just for meat but also for the 'secondary products' of the live animal (52). Sheep and goats can be bred not just for meat but also for milk, which as cheese becomes a form of storable protein, and sheep could also provide wool. Cattle were much harder to feed than sheep in terms of their fodder requirements, as well as needing more water, but they could provide far more meat and manure, as well as having the potential to produce milk for human consumption and pull ploughs and carts. Pottery facilitated the production of milk, yoghurt, and cheese. Pigs were valuable in a different way: because of their omnivorous feeding habits, and the fact that they are prolific breeders, they were a very effective way of turning the fruits of the forest into meat that could be either cured or consumed immediately.

The addition of pigs and cattle to the cereal/ legume/sheep/goat mix during the PPNB in SouthWest Asia marked the emergence of the remarkably robust Eurasian agricultural system. Cereals and legumes fed both people and live-stock. The livestock were vital for cultivation systems because of their manure and, in the case of cattle, pulling power. In time, the system proved to have enormous potential for feeding large numbers of people in a wide range of environments, from western Europe to the Indus Valley, and from the Arctic Circle to the borders of the Sahara (and, with European colonialism, the New World). However, though in the literal sense flocks and herds were indeed a 'walking larder', the fact that they were particularly valuable on the hoof meant they were ideally suited to become a principal mechanism by which social inequalities and hierarchies developed amongst many early farming communities keeping them. Livestock became capital that, more easily than land, could be accumulated through social alliances or warfare, and expended through gift-

giving, clientship, marriage dowries, feasting and so on, in the pursuit of wealth, prestige, and power.
Late Neolithic Mesopotamia: In Mesopotamia, early farming villages were established in an area that was far less viable economically than Anatolia, yet it was in this arid zone, virtually devoid of natural resources, that urban civilization first developed. From the sixth millennium BC, Mesopotamia was to be the center of the social, technological, and political progress that led to the world's first truly urban society.

Development throughout SouthwestA s i a had been more or less constant until about 6000 BC, and methods of producing and storing food were well developed. As there was no longer a pressing need to obtain food by hunting, fishing, or gathering, the need to settle in places that offered wild food resources gradually diminished. For the first time, it became possible to establish settlements outside previously favored areas.

During this period, increasing experience in plant cultivation made it possible to raise the yield; per unit of land, and with the aid of irrigation, two or three harvests could be produced a year. Less land was needed to feed the inhabitants of a settlement, which meant that settlements could be established closer together. This was important, because the geographical proximity of settlements was a prerequisite both for the creation of settlement systems and for the division of labor within communities. The finely painted pottery of the Halaf period, named after Tell Halaf, in northern Syria, is an example of craftwork produced by specialists - a clear evidence of division of labor. Most of what we know about Southwest Asia from about 6000 BC to 3500 BC is based on styles of pottery. Little is known about other evolving technologies that changed settlement patterns or about new forms of economic organization.The first phase of Late Neolithic culture in Mesopotamia (6000 BC to 5500 BC) is commonly considered to be the Hassunan, named after the site of Tell Hassuna, which lies west of the middle Tigris River, about 30
kilometers (20 miles) south of modern-day Mosul. While the country is undulating and merges imperceptibly with the uplands, it is low-lying in comparison with the hilly region where nearby Jarmo is located. Other sites of the Hassuna culture are restricted to a limited region of similar terrain in northern Iraq.

In content and style, the early Hassunan artifacts - stone tools and simple pottery - were clearly a continuation of what had been produced in Jarmo, as though the Jarmo culture had spread downhill. Although construction methods improved during Hosanna times, dwellings remained simple. Settlements were, in fact, nothing more than villages of farmers.

The next phase of Late Neolithic culture in Mesopotamia (about 5600 BC to 5000 BC) is often called the Samarran, after the Islamic city of Samarra, beneath which a particularly attractive and elaborately painted style of pottery was first found. Similar pottery was found at Hassuna in levels III to VIII, and was long thought to have been imported luxury ware. Recent excavations at Tell es-Sawwan and Choga Mami, however, have confirmed that Samarra must be considered a separate culture and that its people flourished north of Baghdad, on the fringes of the floodplain, some time in the sixth millennium BC.

Perhaps the most important single discovery from these excavations relates to the Samarran economy. In contrast with Hassunan sites, Samarran sites are well to the south of the zone where rain-fed agriculture is now possible, Paleobotanical evidence from both Sawwan and Choga Mami suggests that irrigation was practiced in both areas in the sixth millennium BC. It has even been suggested that agriculture at Sawwan was probably based on seasonal flooding. At both Sawwan and Choga Mami, emmer, bread wheat, naked six-row barley, and hulled two-row barley have been identified, as have considerable quantities of linseed, The villages at both sites are large in comparison with those from earlier periods, occupying areas of up to 5 hectares(12 acres). Stamp seals have been found, suggesting that private ownership was recognized, and a more conscious

professionalism among Samarran craftspeople is indicated by the widespread use of potter's marks. Surplus wealth had become available for nonproductive purposes. This is especially evident at Tell es-Sawwan, Here, beneath several unusually large buildings, numerous graves have been found, many containing the remains of infants, The graves also contained an extraordinary collection of hundreds of ground stone objects - in particular, female statuettes and a variety of elegantly shaped bowls made of alabaster. These objects indicate that Sawwan was a settlement with some special significance. The discovery of a distinctive pottery style at Tell Halaf, on the Syrian-Turkish border, midway between the Tigris and the Euphrates, gave a name to the third phase of Mesopotamian protohistory (5500 BC to 4300 BC). Like the Hassunan, the Halafian culture was centered on northern Iraq, but was considerably more widespread, Halafian sites are also found in northern Syria and somewhat further down the Tigris and Euphrates rivers than Hassunan sites, Halafian settlements were still no more than villages, but construction techniques had improved, and there were cobbled streets between the houses. Although most walls were formed of packed mud, at some sites there is evidence of mud bricks - the first known in Mesopotamia. Also for the first time in Mesopotamia, structures or chambers are found that differ from dwellings or other utilitarian buildings. There consists of vaulted circular rooms shaped like beehives, ranging from about 5 to 10 meters in diameter, and built of packed mud. Sometimes, rectangular antichambers are attached to them, but these buildings were seldom, if ever, lived in. They may represent the first step toward temple architecture.

Halafian pottery was the finest ever produced in prehistoric Mesopotamia, (The historic period begins with the first written sources, about 3200 BC.). Handmade from very fine clay, it had thin walls and was decorated with skillfully applied paintings of geometric motifs and, occasionally, figures of animals, birds, and flowers. Flat stamp seals of steatite or other stone, engraved with simple geometric figures and used to impress ownership marks on lumps of clay attached to goods, were abundant in the Halafian period,

The dating of Halafian sites is controversial, but various authorities place the end of the Halafian culture well into the fifth millennium BC, as late as 4300 BC. From about 6000 BC to 4500 BC, the middle reaches of the Tigris and Euphrates river valleys in northern Mesopotamia were settled by farming peoples who had probably moved in from one or more regions of the central Zagros Mountains area to the east, north, and west. Farming techniques were established but not elaborate, and permitted only a moderate increase in the number, size, and quality of settlements during the period. Some developments are especially notable: native copper was occasionally worked, although not for the first time in Southwest Asia; pottery was greatly improved, aesthetically and technologically; and the plow came into use as an aid to agriculture. **AChangingParadigm:** The presently emerging picture of plant and animal domestication and agricultural origins in the Near East is dramatically different from that drawn 30 years ago in a landmark article by Bar-Yosef and Meadow (46) and quoted so profusely in this chapter. While in and quoted so profusely in this chapter. While in year gap between plant and animal domestication, it now seems that both occurred at roughly the same time, with initial management of morphologically wild future plant and animal domesticates reaching back to at least 11,500 years ago, if not earlier. This deepening of food production is partially the result of changing definition of domestication and cultivation. A focus on the southern Levant as the core area for crop domestication and diffusion has been replaced by a more pluralistic view that sees domestication of various crops and livestock occurring, sometimes multiple times in the same species, across the entire region. Morphological change can no longer be held to be a leading-edge indicator of domestication. Instead, it appears that a long period of increasingly intensive human management preceded the manifestation of archaeologically detectable morphological change in managed crops and livestock. Agriculture in the Near East arose in the context of broad-based systematic human efforts at modifying local environments and biotic

communities to encourage plant and animal resources of economic interest. This process took place across the entire Middle Asia - an area encompassing the Middle East, Iran, Central Asia and Baluchistan - during a period of dramatic post-Pleistocene climate and environmental change with considerable regional variation in the scope and intensity of these activities as well as in the range of resources being manipulated.

Also contributing to the emerging picture of Near Eastern agricultural origins are genetic analyses that have identified the progenitors of Near Eastern domestic crops and livestock species and defined the likely geographic regions of their domestication. More widespread use of small-sample accelerator mass spectrometry (AMS) radiocarbon dating has made it possible to directly and precisely date the remains of domestic plants and animals, greatly enhancing the temporal control of our understanding of this transition. The result is a vastly changed picture of the origins of agriculture in the Near East.

This deepening of food production is partially the result of changing definition of domestication and cultivation. A focus on the southern Levant as the core area for crop domestication and diffusion has been replaced by a more pluralistic view that sees domestication of various crops and livestock occurring, sometimes multiple times in the same species, across the entire region. Morphological change can no longer be held to be a leading-edge indicator of domestication. Instead, it appears that a long period of increasingly intensive human management preceded the manifestation of archaeologically detectable morphological change in managed crops and livestock. Agriculture in the Near East arose in the context of broad-based systematic human efforts at modifying local environments and biotic communities to encourage plant and animal resources of economic interest. This process took place across the entire Middle Asia - an area encompassing the Middle East, Iran, Central Asia and Baluchistan - during a period of dramatic postPleistocene climate and environmental change with considerable regional variation in the scope and intensity of these activities as well as in the range of resources being manipulated.

The last point introduces another important observation of general applicability for any general theory about the agricultural revolution in prehistory: that people then as now had choices and took decisions in historically contingent circumstances. The population of South-West Asia responded to the threats and opportunities of profound landscape change in the millennia on either side of the Pleistocene-Holocene boundary in different ways. Some maintained existing modes of subsistence by moving to new areas; others diversified; and still others intensified in ways that were to develop into what in time becomes recognizable to us as the Eurasian system of mixed farming. Developing a reliance on domesticated cereals, in particular, can be understood as an irrevocable step, because the demands of time and labour involved in ground preparation, planting, weeding, protection from predators, and harvesting were, cumulatively, more or less all-year-round and were not easily compatible with mobile foraging.

Although scholars disagree about whether changes in ideology in South-West Asia came before or after changes in subsistence, or whether both developed in tandem in a 'positive feedback' relationship, the debate very usefully underlines another observation of general applicability to this inquiry: that the transition from foraging to farming was as much a social and psychological as an economic and technological process. To change from foraging to farming ultimately involved profound transformations in ways of *thinking* and *being* as well as *doing.* As a "privatization" of resources it marked the end of the forager sharing ethic, and as a commitment to a more permanent corporation it created new roles both for the living and the dead' (53).

Conclusion: The model commonly proposed in the past thirty years has been as follows: cereals were domesticated in the southern Levant, in the Jordan valley especially, in the mid-tenth millennium BC (the PPNA); sheep and goats were domesticated several centuries or a millennium later in the Zagros

mountains; and the separate components then came together (a process begging many questions, of course) as PPNB mixed farming. This coherent sequence of change, though, is almost certainly only a small part of the story but it does appear to be a reasonably good example of a gradualist evolutionary cultural sequence. From about 11,000 BC, with the beginnings of the Natufian, to about 6000 BC, with the end of PPNB, we seem to have 5000 years of gradual change which takes humans from the experimental stage of agriculture and animal domestication to settled villages with the domesticates in place. The Baluchi and Central Asian sequence, to be discussed a little later, is somewhat different from this, but it is based on only fragmentary data, so that it should not come as a surprise. We need to be mindful of the difference between evidence and absence of evidence.
The geographical focus of research in the region on which the story is based has been extremely restricted. Especially in recent years, a few places such as the Jordan valley in Israel and Jordan, and parts of Turkey, have been the scene of intensive research by many teams. This is in stark contrast to most of the Zagros, to say nothing of the rest of Iran east of the Zagros, an area at least as large as the Fertile Crescent.

IV.2. Beginning of Agriculture in Central Asia, Afghanistan and Iran



Central Asia has not been generally regarded as a primary center of early agriculture, despite the discovery in the western part of the region of much evidence of early neolithic food-producing communities. Similarly, Iran as a whole has been ignored in this search. The developments in and around the Zagros mountains in western Iran are significant but they are included in the “Near East” picture in order to strengthen the well-publicised case of the Fertile Crescent as the ‘hearth of agriculture’. Some preliminary evidence for early domesticated animals is available from northern Afghanistan but for the prolonged political turmoil in that area, the research could not progress beyond that point.

In this Chapter our aim is to summarize the available evidence and to set it in a broader Middle Asian context. In this endeavor, we take advantage of an excellent review of David Harris and Chris Gosden, published in *The Origins and Spread of Agriculture and Pastoralism in Eurasia* (56). Although somewhat dated, it is still the most comprehensive review available on the subject. A more recent account is a book-length version of Harris’s *The Origins of Agriculture in Western Central Asia* (57).This book mainly focuses on southern Tukrmenia but deals with Middle Asia generally. The page on Iran seems to be blank but we have included in this review what is available and relevant. These reviews are complemented in some measure with a brief description of the situation in Afghanistan by Gregory Possehl (5,58).

For present purposes, Central Asia can be regarded as the vast region of mountains and deserts that extends eastwards from the Caspian Sea to the Takla Makan Basin. Very little is known archaeologically about the beginnings of agriculture and settled life over most of the region, but in its western part a series of early neolithic sites has been identified in the relatively narrow zone between the Iranian Plateau and the Kara Kum Desert. These sites share many aspects of material culture and they collectively constitute the Jeitun Culture. They are the earliest well studied agropastoral settlements in the region, dating back to the sixth millennium BC, and they are distributed along the piedmont at the foot of the Kopet Dag range which forms the northern edge of the Iranian Plateau (see map below).

This major physiographic boundary between mountainous upland and alluvial lowland is comparable in scale, and perhaps also in prehistoric significance, to the western and eastern margins of the Iranian Plateau, where, respectively, the Zagros Mountains and the hills of Baluchistan overlook the alluvial lowlands of the Tigris-Euphrates and the Indus Valley, respectively. This comparison has been made, among others, by Allchin and Allchin (59) who suggest that “we may expect to find broadly parallel cultural developments taking place in these three border regions of the Iranian plateau, creating a vast area which may be loosely defined as a cultural interaction sphere, with contacts maintained by land routes in the interior of the plateau". Tosi (60) too has referred to the boundary between the Kopet Dag and the Kara Kum as "the northeastern frontier of the ancient Near East". A similar viewpoint has been advanced here. The area under consideration is southern part of Turkmenia and northwestern part of Afghanistan.

Along with its geographical bearings, it is also important to place the evidence for early agriculture in southern Turkmenistan in its biogeographical context, in terms of the distribution of the wild progenitors of the principal cultivated plants and domesticated animals associated with neolithic settlement in the region. The Russian botanist Vavilov, whose worldwide studies of centers of origin of cultivated plants had a profound effect on students of early agriculture, included western Central Asia and Pakistan in his Southwest Asiatic Center, which was one of the five centers he identified in his first major publication on the subject. He subsequently added a separate Inner Asiatic Center which encompassed Pakistan, Afghanistan, Tajikistan, Kirgiziya and eastern Uzbekistan, but not the mountains of Turkmenistan, which remained part of his Southwest Asiatic Center, now described as corresponding to Asia Minor in a wider sense (61) (a division he later abandoned and returned to his original concept of a single, large Southwest Asiatic Center).

These changes in the delineation of the western Asiatic center reflect the fact that the less mountainous country that separates the eastern Kopet Dag from the western Hindu Kush is not a significant biogeographical boundary, and that the wild ancestors of some of the Southwest Asian cereals (e.g. barley, rye), pulses (e.g. lentil, grass pea) and fruits (e.g. grapevine, apple, pear, almond, walnut, pomegranate) are, or may be, native to western Central Asia as well as to Southwest Asia on one aurochs and pig, although the probable centers of sheep and goat domestication may lie farther west in Southwest Asia or farther south in Baluchistan.

On archaeological and biogeographical grounds, therefore, Central Asia, particularly southern Turkmenistan, can, and probably should, be regarded not as a marginal area distant from the main foci of early agriculture farther west but as an integral part of an expanded “core area” that spread from the Mediterranean to the Indus Valley and from the Zagros to the Amu Darya. The Neolithic settlements became widely established from the Levant to the northern and eastern margins of the

Iranian

ARL
CHK
Kel'teminar
Ferghana
Amu Darya riv.
Djeitun
OKN
Hissar
AK
SIC
TS
Euphrates riv.
Nile riv.
TY
MGR
Indus riv.
Narmada riv.

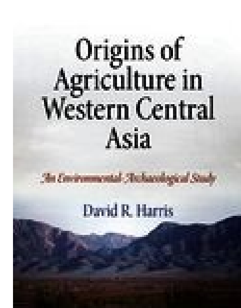
Fig. 9 Map of the Neolithic of West and Central Asia in relation to Northwestern South Asia. Important Neolithic cultural zones, discussed in the text, are
*fertile crescent area is indicated (for details, see Fig.***Map of the Neolithic of West and Central Asia in relation to Pakistan. Neolithic cultural zones, discussed in the text, are***), with arrows indicating the direction of westward dispersal of wheat/barley agropastoralism. Other documented early Neolithic cultural zones discussed in the text are indicated. Probable late preceramic/early ceramic Neolithic cultural extensions are indicated***shaded. The greater Fertile Crescent area of wheat/barley/sheep/goat argo-poastoralism of early Neolithic in Central Asia** *by hatching in northwest Turkey*
(after
¨Ozdogan, 1997) and in northern Afghanistan (based on surveys of Vinogradov, see Sarianidi, 1992;Possehl, 1999,p.437).OtherimportantNeolithicsitesareindicated
by squares, with the abbreviations: CHK: Chokh, ARL: Arukhlo, SIC: Sang-I-Chakmuk, AK: Ak-Kupraq, TY: Tepe Yahya, TZ: Tepe Zaghe, TS: Tepe Sialk, MGR
OKN: Oshkona. The probable wider cultural zone of the Baluchistan Neolithic or Khili Ghul

Mohammad Tradition is indicated by dashed line (based on Pos hand and Baluchistan on the other (21). This has [4.14)]been conclusively proven in the case of barley.

The importance of Vavilov's observations lies not in any minor differences between his western and Central Asian centers but in the fact that the southern Turkmenian area of early agriculture is part of the extensive combined region from which most of the crops of neolithic Southwest Asian agriculture

originated. Study of the distribution of the wild progenitors of the main domesticated animals associated with neolithic agriculture in Southwest Asia leads to a comparable conclusion; indeed, southern Turkmenistan occupies a central position within the area of overlap of the ranges of the progenitors of the four main domesticates: goat, sheep, Plateau between the ninth and sixth millennia BC. It is within this regional framework that the specific evidence of early agricultural settlement in the piedmont zone of southern Turkmenistan should be viewed.

Early Agricultural Settlement in Southern Turkmenistan: The development of sedentary agricultural societies in Central Asia, and the degree to which it represents indigenous processes or external stimuli, has long been a topic of debate. One of the focal points of the discussion is the site of Jeitun in southern Turkmenistan, the type site for the ‘Jeitun Culture’, where documented evidence of sedentary Neolithic occupation occurs by the end of the 7th. millennium B.C.



There is archaeological evidence of settlement in the well-watered northern foothills of the Kopek Dag during the Neolithic period. This region is dotted with the multi-period sites with hallmarks that are characteristic of the ancient Near East. Masson's comprehensive excavation of the upper levels at Jeitun revealed a settlement of rectangular one-roomed dwellings built of cylindrical clay blocks and containing large ovens (62). Walled yard areas and outhouses were found between and adjacent to many of the houses. No plant remains were recovered, but impressions of barley and wheat grains in the clay blocks, and the bones of domestic sheep and goat, indicated that the inhabitants grew cereal crops and herded livestock. No radiocarbon dates were obtained at Jeitun, but Masson proposed, on the grounds of close similarities between the artifact, especially the ceramic, assemblages at Jeitun with those from the upper layers at Jarmo and Tepe Guran in Iran, that the site had been occupied in the sixth millennium BC (62). At the late Neolithic site of Chagylly Depe, farmers increasingly grew the kinds of crops that are typically associated with irrigation in an arid environment, such as hexaploid bread wheat, which became predominant during later periods.
As archaeological survey and excavation continued in the piedmont zone through the 1950s and 1960s, more sites whose structural features and artifact assemblages resembled those at Jeitun were discovered, and three successive phases of the Jeitun Culture - d i f f e r e n t i a t e d b y changes in pottery decoration - were distinguished. Radiocarbon dates were obtained from two of these sites: at Togolok west of Jeitun "Middle Jeitun" levels were dated to 5370 ±100 BC, and at Chagylly in the eastern piedmont "Late Jeitun" levels were

dated to 5050 ±110 BC. At Chagylly grains of tworow barley (reported as *Hordeum distichum)* and of wheats (reported as *Triticum vulgare* and *T compactum)* were also identified. In all, some 13 sites (and 5 surface scatters) attributable to the Jeitun Culture were found in the piedmont zone (56) and the available carbon dates attributed the Jeitun Culture to the sixth millennium BC. The excavators also implied that the "Early Jeitun" phases, represented at Jeitun itself, probably dated back to *ca.* 5500 BC. However, no radiocarbon dates were obtained for that phase. The middle phase is represented in the

upper levels at the latter two sites and at Bami, Pessedjik and New Nisa, as well as in the lower levels at Mondjukli and Chagylly (where the late phase is also best represented).

This spatial and temporal pattern of site distribution suggests that Jeitun Culture settlements were established earlier in the western than the eastern piedmont, although this inference must remain tentative because it is possible that other early neolithic sites on the piedmont have been buried by subsequent colluvial, alluvial and aeolian deposits and have thus remained undetected. Indeed, this process is evident at the major Bronze Age sites of Altyn-depe and Namazga-depe, where soundings have revealed cultural deposits several meters below the present surface of the piedmont (63).

The distribution of Jeitun Culture sites in the piedmont zone may also reflect differences in the geomorphology and hydrology of the zone itself. In its western section between Kizil Arvat and Ashgabat, which is known as Akhal Atak, short streams debouch on to the upper piedmont from narrow gorges cut through the steep mountain front of the Kopet Dag, traverse the coalesced alluvial fans that make up the piedmont, and flow into the sands of the Kara Kum where they dissipate through percolation and evaporation. The discharge of these streams is smaller and, because they are fed largely by groundwater, more stable than that of the longer rivers - the Tedjen and the Murghab - at the eastern end of the piedmont zone. The flow of the western streams is at a maximum from March to May, when it is augmented by rainfall and some snow-melt, and at a minimum from June to October. Precipitation throughout the piedmont zone is too low to sustain rain-fed cereal cultivation: annual rainfall varies from 140 to 250mm and precipitation exceeds potential evaporation only in January (56). On the assumption that the seasonal moisture regime that prevailed in the Early Jeitun phase did not differ significantly from the present one and, even if annual precipitation was greater then and spring floods more pronounced, the rain fed cultivation of cereals would have been impossible. It must therefore be assumed that the crops of the earliest Jeitun cultivators depended on irrigation and/or groundwater through the growing season. These hydroclimatic conditions may help to explain why the earliest Jeitun settlements are located in the western section of the piedmont and also at or near the outer margins of the alluvial fans. There streamflow would have been slower than higher up on the piedmont, spring floods would have been less destructive, and the sediment deposited by them finer and more fertile.

The site of Jeitun itself exemplifies these locational advantages. It lies at the margin of the alluvial fan of a piedmont stream - the Kara Su - which cuts through the southernmost dune ridge of the Kara Kum Desert. Today the Kara Su is fed from an artificial lake created as part of a large-scale irrigation scheme, but it still maintains a channel through the dune ridge and flows into the desert past the small dune on which today receives irrigation overflow and provides water for livestock and which in the past could have provided Jeitun cultivators with water for irrigation. It is also quite possible that the water table below the interdune flats around Jeitun, which would have been recharged by the spring floods of the Kara Su and by the infiltration of rainwater through the dunes, would have been high enough to permit small-scale cultivation of wintersown cereals without irrigation. Cultivation might also have been possible on the extensive clay formations or *takyrs* which are a conspicuous feature of the southern Kara Kum Desert. *Takyr* surfaces are sufficiently impermeable to retain standing water temporarily and farther north, in the desert, cereals are still sometimes grown on them.

From the early fifth to the middle of the third millennia BC, following the earliest (Jeitun) phases of agro-pastoral settlement in the western piedmont, irrigation agriculture was developed farther east on the delta plain of the Tedjen River. Detailed investigations in the area of the Geoksyur Oasis in the

eastern Tedjen delta have shown that here the irrigation system was elaborated and extended through the Neolithic period, from small ditches to a network of canals drawing water from the main delta channels and associated reservoirs. Still later, in the second and early first millennia BC (Late Bronze Age and Early Iron Age), more complex irrigation systems were developed on the delta plains of the Murghab and Atrek rivers; cultivation on the piedmont was intensified around the major, now "protourban", settlements, which have been dated to the first millennium BC at Ulug-tepe, began to be constructed. Thus, in the three millennia following the (Jeitun) Neolithic, agricultural settlement expanded on the piedmont and also spread beyond it to the deltaic plains of the Tedjen, Murghab and Atrek rivers. However, by the first millennium BC most of the deltaic settlements had been abandoned as a result of increasing climatic aridity.

Tie-in sites are related to Sang-i Chakmak which is located on the Iranian Plateau on the eastern side of the Elburz Mountains near Bastam north of Emamrud. The site consists of several small tells on alluvial land, two of which were excavated. The eastern mound was found to contain abundant pottery and other stone, bone and clay artifacts which closely resemble the material culture of the Jeitun sites in Turkemania as well as that represented in the lowest level at Yarim. The buildings were made of cylindrical clay blocks the same size and shape as those used at Jeitun, and the finds included clay figurines of animals and wooden sickle handles decorated with animal designs. There are no radiocarbon dates for the eastern mound, but it is thought to date to the Late Jeitun phase.

In contrast to the eastern mound at Sang-i Chakmak, the western one was almost devoid of pottery - only three ceramic sherds were found in the five levels excavated - but the rectangular plan and buildings of the settlement resemble those of the Jeitun Culture. Two radiocarbon dates, of 5505 ±155 BC and 5540 ± 130 BC, were obtained, which, when calibrated, give values (at two standard deviations) of 63 81 BC and 6373 BC.

The maximum time span of the 11 AMS radio-carbon dates that have been obtained at the site of Jeitun is 6300-5700 cal BC, but only one of those dates produced (two) calibrations (just) over 6300 BC and both of them have very low probabilities of representing the "true date". The dates from Jeitun essentially indicate an occupation there at c.

KARA KUM DESERT



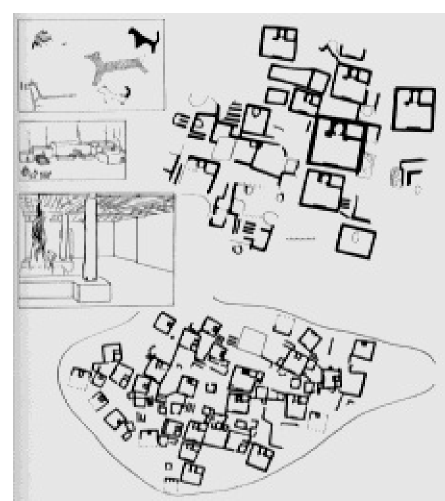
Map showing the relative location of Kopet Dagh hills, Kara uKm Desert, and the Jeitun Neolithic settlements on the boundaries between the two. Also shown are two major rivers

6000-5800 BC, so it does appear that the western mound at Sang-i Chakmak was occupied at least two or three centuries before Jeitun - probably earlier because only the third level has been dated. One concludes therefore that Sang-i Chakmak is both the westernmost and the earliest dated neolithic settlement at present attributable to the Jeitun Culture.

During the Copper Age, the population of this region grew. Masson, who led the South Turkmenistan Complex Archaeological Expedition, sees signs that people migrated to the region from central Iran at this time, bringing metallurgy and other innovations, but feels that the newcomers soon blended with the Jeitun farmers. By contrast a reexcavation of Monjukli Depe in 2010 found a distinct break in settlement history between the late Neolithic and early Chalcolithic eras there.

Major agricultural settlements sprang up at Kara-Depe and Namazga-Depe. In addition there were smaller settlements at Anau, Dashlyji and Yassy-depe. Settlements similar to the early level at Anau also appeared further east – in the ancient Delta of the River Tedzen, the site of the Geoksiur of the Altyn-Depe and Geoksiur type. Thus the farmers of Iran, Turkmenistan and Afghanistan were connected by a scattering of farming settlements.

Investigations of Early Agro-pastoralism at Jeitun: Jeitun itself is the most thoroughly investigated site of the Jeitun Culture. It was first visited by archaeologists in 1952 but more systematic investigation was begun in 1955, and by 1962-3 the second structural level of the site was almost completely excavated. Masson and his colleagues sug



Jeitun culture: plan of settlement and reconstruction of a house and artifacts

gested, on the basis of soundings, that five successive building levels were represented in the *ca.* 3 m of cultural deposits which had accumulated to form the small (0.7 ha) tell. Excavation was resumed at Jeitun in 1987, when Kurbansakharov opened a l0x10m trench at the eastern end of the mound. This revealed house structures that were thought to represent the third level. The excavation continued through a program of collaborative work by an international team of British, Russian and Turkmenian archaeologists, which was begun in 1989. The principal aim of the new investigations was to gain more detailed information about the ancient economy and environment of the site and to establish a radiocarbon chronology for its occupation. A particularly important objective was to obtain plant remains by systematic sampling and flotation technique. These continued for six from 1989 to 1994, and so far only preliminary results are available. They do, however, provide conclusive evidence that domesticated einkorn and emmer wheat *(Triticum monococcum* and *T dicoccum)* and six-row barley (both naked-grain and hulled-grain varieties of *Hordeum sativum)* were being cultivated

locally by 7000 BC (6000 cal. BC). Masson's original assumption that domestic cereals were cultiinvestigations

field seasons,

Oasis. About 3500 BC the cultural unity of the culture split into two pottery styles: colorful in the west (Anau, Kara-Depe and Namazga-Depe) and more austere in the east at Alton-Deep and the Geoksiur Oasis settlements. This may reflect the formation of two tribal groups. Around 3000 BC it seems that people from Geoksiur migrated into the Murghab Delta, where small, scattered settlements appeared, and reached further east into the Zerafshan Valley in Transoxiana. In both areas pottery typical of Geoksiur was in use.To the south the foundation layers of Shahr-e-Sokhta on the bank of the Helmand River in south-eastern Iran contained pottery vated by the inhabitants of Jeitun during the sixth millennium BC was thus confirmed, and, indeed, agriculture at the site was shown to date back to the very beginning of that millennium (56).

Further information on how the cereals were cultivated was gained from Hillman's on-site examination of the plant temper that was used in building the walls and ovens at Jeitun. He found that the temper consisted of cereal straw, which strongly suggests that the crops were cultivated locally, and the lack of basal ear nodes in the temper implies, respectively, that the cereals were harvested by sickle rather than by uprooting, and that the ears were reaped separately from the straw in a "double-harvest" system.

When the archaeobotanical data so far analyzed are viewed in relation to the 11 AMS radiocarbon dates obtained at Jeitun there is no indication of changes in plant use through time; more specifically, there is no evidence in the lower levels of greater use of wild plant foods and cereal cultivation appears to have been the main form of plant exploitation from the initial occupation of the site to its abandonment.The excavations at Jeitun, from the 1950s onwards, have yielded abundant corroborative evidence of cereal cultivation in the form of stone sickle blades and grindstones. Sickle blades alone are said to account for 37 per cent of all the tools found in the earlier excavations (62). Korobkova (64) has claimed, on the basis of her extensive experimental studies of harvesting and micro-wear on the blades, that the knives found at Jeitun could each be used for 20-25 hours before it was necessary to retouch the blades. She further concludes, in the absence of any traces of retouching on the blades, that the knives were seasonal implements repaired from one year's harvest to the next; and from this she calculates, by reference to the average area that can be harvested in an hour and the total number of knives (527) inferred to come from the second structural level, that an area of 21-33 ha would have been cultivated annually at Jeitun. This extended chain of inference involves several speculative assumptions, but it is worth noting that the annual cultivated area estimated by this method corresponds quite closely to Masson's estimate of 20-22 ha based on calculations of the annual need for grain of the population of Jeitun, which he assumes to have been between 150 and 180 people (56). Grindstones, which were probably made on site from imported slabs of sandstone, also attest to the importance of cereal grains in the Jeitun domestic economy; but no stone tools resembling hoe blades or other tillage implements have been found - perhaps wooden digging sticks and/or hoes were used.

Animal remains in the form of bones, teeth and shell are well preserved and quite abundant at Jeitun. Masson argued that most of the caprines were domesticated and that they supplied most of the meat in the diet. Altogether, 15 taxa have been identified: twelve mammals, one species of bird, one lizard and

one tortoise. Fish vertebrae and other fish bones have been recovered by flotation since 1992, but they have not yet been studied. The caprines are the most abundantly represented mammals in the assemblage. Jeitun lies within the ranges of the wild bezoar and urial, and Kasparov's identification of both domestic and wild caprines at Jeitun, which is based largely on differences in their size, is probably correct. According to his analysis of the minimum numbers of individuals represented in the whole assemblage that he has studied, domestic animals comprise 57 per cent (91 individuals) and wild animals 43 per cent of the total (56).

The domestic animals in the assemblage consist almost entirely of sheep and goats. Only four dogs are represented, and no bones of domestic or wild cattle, horses or onagers have been found at Jeitun - although the remains of both cattle and onagers have been found in Late Jeitun levels at Chagylly. Among the wild animals, the goitred gazelle *(Gazella subgutturosa)* is the most abundant (21 individuals), followed by wild goat and sheep (11 individuals in all), red fox (5), wild boar, tolai hare, steppe cat and tortoise (each 3). These small samples should not be taken to indicate the relative importance as prey of the wild animals hunted by the inhabitants of Jeitun, although it is likely that gazelles were the chief prey. They may well have been hunted seasonally close to the site because large herds used to migrate from the mountains and upper piedmont to winter in the Kara Kum before returning to the higher country in the spring and they could readily have been intercepted as they moved into and out of the desert. Wild sheep and goats, on the other hand, did not migrate seasonally over long distances, and hunting them from Jeitun would probably have involved journeys to the foothills of the Kopet Dag of at least 40-50 km each way.


A view of Gara Gum (Kara Kum) Desert in southern Turkmenistan

There is insufficient zooarchaeological data from Jeitun to assess with any accuracy the importance of hunting in the domestic economy, although the abundance of gazel bones recovered both in Masson's earlier, and Harris’s later excavations, suggests that their meat contributed substantially to the diet. However, Masson has drawn attention to the surprising absence of arrow- or spear-heads in the lithic assemblage and has suggested that geometric microliths, which are present in large numbers, may have been mounted in wooden shafts to form some form of hunting missile; he also suggests that slings were used in hunting (62). The preponderance of sheep and goat bones in the assemblage analyzed by Kasparov, most of which are from domesticated animals, implies that

caprine pastoralism was important in the domestic economy. Although no structures suggestive of animal pens or stalls have been found at Jeitun, micromorphological analysis of deposits from one of the yard areas has demonstrated the presence of small humus-stained ovoid masses that she interprets as goat droppings, and pellets of goat/sheep dung have been found in most of the excavated samples processed by floatation. Possibly the animals were brought into the settlement at night to protect them from predators, after they had grazed and browsed locally during the day. Some seasonal transhumance may have been practiced, alternating summer grazing in the foothills of the Kopet Dag with winter grazing of pastures in the desert (63).

The question of whether the sheep and goats were managed primarily or exclusively for meat, or also for milk, has been considered by Legge (65), who analyzed slaughter patterns by determining age at death from the caprine mandibles. He concluded that there was no strong seasonal pattern of slaughter because the teeth exhibit all stages of eruption and wear, and from this he inferred that the sheep and goats at Jeitun were exploited mainly for meat, although they may also have provided milk, as well as hair, wool and skins. He also argued that the lack of evidence for a seasonal pattern of slaughter implied that Jeitun was likely to have been occupied throughout the year.

Kasparov (66) examined the distribution of bones in one house and its associated yard and outhouse and found that the sheep/goat bones in the house came from the meatiest parts of the carcasses, whereas almost all skeletal elements were present in the yard and outhouse deposits (which latter also contained fox, cat and wild boar), and many of those bones also showed evidence of gnawing by dogs - suggesting that carcasses (of sheep, goat and boar) were butchered and skins (of fox and cat) dressed in the yard and outhouse, and cooked meat eaten in the house. It is interesting, too, to speculate on the economic and social role of dogs at Jeitun. Masson assumes that they were used in hunting, and Sarianidi thinks that they may have assisted shepherds tending flocks of sheep and goats. That their role was not simply utilitarian is, however, suggested by the presence of small animal figurines made of clay, some of which are distinctly dog-like, and, more convincingly, by Harris's discovery of the skeleton of a dog which had been interred, with a pottery vessel, in a wall of one of the houses at Jeitun. No human bones were associated with this dog burial - nor have any been found elsewhere in the excavations - but it brings to mind the evidence of dogs buried with their (presumed) owners at the neolithic site of Burzahom in Kashmir (which is unparalleled in South Asia) and, even farther afield, the neolithic dog burials of northern China and Manchuria.

The Evidence from Iran: We may distinguish several cultural centers among the early agricultural communities in Iran. The principal regions are the northern, the central, and the southern Zagros, the Khuzestan lowland, and southern Iran. Southeastern Iran, which is likely to have been important in the Neolithic, has not been sufficiently investigated, a situation that also pertains to much of the northeast. Southern Turkmenistan shares much with northeastern Iran, while Afghanistan, potentially important, has seen little exploration. The earliest evidence for the beginning of agriculture in Iran comes from several western Iranian sites such as Sarab, Gūrān, Ganj Dareh, and Ali Kosh. Similar developments in the Zagros Mountains, on the Iraqi side of the modern border, are also traceable at sites such as Karīm Shahīr and Zawi Chemi–Shanidar. All these sites date wholly or in part to the 8th and 7th millennia.

Only a handful of early Neolithic sites have been excavated and published in sufficient detail to inform on the process of domestication and its regional variations. From north to south, these are Hajji Firuz on the Solduz plain of Azerbaijan, Tepe Sarab on the Kermanshah plain, Tepe Guran in

the Hulailan valley, Tepe Abdul Hosein and Ganj Dareh in the high mountains of Luristan, Tall-e Jari and Tall-e Mushki in Marv Dasht, Tepe Ali Kosh and Chogha Sefid, also spelled Chagha Sefid, in Deh Luran, and Tepe Tula'i and Chogha Bonut in Khuzestan. Sheikh-e Abad and Jain, near Kermsanshah, are the two other aceramic sites which have been recently excavated. Pre-pottery sites in the lowland at the base of the Zagros and possibly in the Luristan mountains are probably numerous but, because of burial or erosion by geological processes, such sites may have disappeared from view.

The site of Sarab, again near the city of Kermanshah, was a small camp of huntergatherers, only seasonally inhabited. Besides the fact that wild goats and sheep were hunted, great numbers of snail shells were found. These finds were interpreted in the way that from time to time the hunting activities of the inhabitants of Sarab were unsuccessful and that then they were forced to consume food which they usually did not like. Some nearby and more constantly occupied settlements in the Zagros date from a short time after Sarab, from the time between 8000 and 6800 BC. The material culture of Tappeh Ganj Dareh and Tappeh Abdul Hosein also does not include any pottery. This is also true for the oldest levels of Tappeh Guran, located in Luristan, as well as for the sites of Ali Kosh and Chogha Sefid in the plain of Deh Luran, west of the Zagros Mountains.

Sheikh-e Abad in the high Zagros and Jani, in the foothills of the Mesopotamian plains, make major contributions to knowledge regarding the origins of sedentism and increasing resource management in Southwest Asia, and associated developments in social, cultural and ritual practices in this formative region of human cultural development. The importance of these sites lies in their early date and long occupation spanning *ca.* 9800-7600 cal BC. This region provides great scope for investigation of east-west movements of people, animals, materials, ideas and practices in the first two millennia of the Early Holocene.

In the eighth millennium BC, agricultural communities such as Choga Bonut (the earliest village in Susiana) started to form in western Iran, either as a result of indigenous development or of outside influences. The mound of Ali Kosh, in Khuzistan, on the Deh Luran plain, provides the first evidence. The major food crop from the earliest period of Ali Kosh was emmer, which was not native to increasing evidence that winter-grown cereals were cultivated.

Tepe Ganj Dareh is situated at 1,400 m above sea level in Luristan, and has the oldest evidence, dated to about 10,000 years ago, for goat domestication in Iran. This tiny site may have been used only seasonally because of the cold winters and heavy snow cover at this altitude, although other small sites of similar age are known from the same general region. The site contains little mud brick rooms, probably used for storage of grain. Like some semi-nomadic people in the region today, herders may have planted summer crops near Ganj Dareh while they made use of the highland pastures



Neolithic sites in Iran

the area. Wild two-row hulled barley was also present, and presumably cultivated. The earliest people known here also herded goats and sheep, and supplemented their diet by hunting, fishing, and collecting wild food. No acceptable radiocarbon dating exist for this stage of occupation, but the succeeding phase appears to date from some time between 7200 BC and 6400 BC, which would make it roughly contemporary with the early Jarmo and early Palestinian sites. In the second Ali Kosh phase, there is and stored the grain for use during the following summer. Tepe Abdul Hosein is located at 1,860 m above sea level in the Khava mountain valley of Luristan. It is one of the oldest Neolithic sites yet excavated in this region, dating to about 9,500 B.P., somewhat later than Ganj Dareh and about the same age as the preceramic Deh Luran sites, as indicated by the stone tools that are comparable with those from Tepe Ali Kosh and Chogha Sefid. The oldest layers, consisting of a series of fire pits, are preceramic, while later layers have mud brick walls. The sparse pottery from the upper layers resembles types dating to the early fifth millennium BC. It would appear that the site was abandoned for a few thousand years between the main periods of occupation. Hajji Firuz on the Solduz plain is dated to 7,900-7,500 years ago. Both the date and the pottery link it securely with Hassuna sites of lowland Mesopotamia. Today this area is winter pasture for transhumant herders who migrate seasonally between the lowlands and the highlands. Like other contemporary sites, Hajji Firuz was a small village with single-family dwellings inside of which the dead were buried. The economy was a mix of farming and herding, perhaps with seasonal migration. Of special interest is the discovery of the residue of resinated wine in a pottery jar, the oldest evidence of wine in the

world.

Tall-e Mushki and Tall-e Jari are Neolithic sites in southern Iran near the city of Shiraz. Both have been excavated by a Japanese team, but poorly reported. The older, Mushki (8,000-7,500 (8,000-7,500 6,900 B.P.) was dug in 1959. The Marv Dasht is about 1,600 m in elevation, and in recent historic times has been summer pasture of Bakhtiari and Qashgai pastoralists.
Muskhi has relatively crude, chaff-tempered pottery with black or brown paint on a dark-red surface, a tradition that continues with Jari pottery, though with new designs and vessel shapes. Persian Gulf shells, copper artifacts, and some obsidian point to widespread interregional contacts. The absence of substantial architecture, coupled with the relatively shallow site, suggests that Mushki may have been occupied only seasonally. The survey of the Marv Dasht has turned up only six Mushki sites, while there are 48 with Jari-style pottery, and another 28 in nearby regions. The great increase in numbers of sites implies sedentary populations at least during the Jari period.

It looks as though the precursors of the Khuzistan villages had originally been based on the caves and rock shelters of Luristan. The flint industries from the earliest villages included fluted cores and microliths, and it is significant that the latter, modified by changes of pattern, persisted into the fourth millennium B.C. On the other hand, the blades of sickles (or more correctly reaping knives) were already present in the earliest village levels. Analysis of organic traces from successive levels shows that subsistence underwent gradual but progressive changes Whereas dry farming was at first subsidiary to hunting and gathering, it came in due course to replace these activities as the principle source of food. Again, the productivity of agriculture was greatly enhanced by the development of effective irrigation. By far the most important source of meat during the dry farming phase was that furnished by caprines, in itself a sign of movement from the highlands to the steppe plains. Among the caprines sheep were markedly subsidiary to goats. The predominance of young males and the complete absence of old individuals among the caprines argues for some degree of domestication from the beginning, though signs of genetic change did not appear until the later phase. Gazelle and onager were fairly strongly represented to begin with, but their later and noteworthy decline argues against them having been domesticated.

The central regions, including Kashan and Tehran, are best-known from the excavations at Tepe Sialk. One may distinguish goats, birds, snakes, horses, bulls, panthers. Human figures are also present in rare cases. A finite, stable, ornament-oriented style shows the artistic pattern of


Pottery vessel, fourth millennium B.C. Zagros (*National Museum of Iran*)

the early agricultural age, as represented by Sialk pottery. A closely comparable culture is represented in the lower strata of Tepe Hissar.

A distinct centre of early agricultural communities was established in Fars; Tal-i Bakun is the best-known site there. Colorful geometric ornament, combined with stylized animal figures is typical of the local artistic style. The cultural ties in the course of the end of the Chalcolithic period resulted in the establishment of a clear interaction with the communities in southern and northern Baluchistan (Tosi, M. et al. *The Bronze Age in Iran and Afghanistan*, 1996).

The sites in Northeastern Iran are important for their proximity to Jeitun sites in Turkmenistan. Jeitun is dated to 8,000-7,800 B.P., and thus contemporary with the later ceramic Neolithic in western Iran. Two sites in Iran, *Tureng and Yarim* on the Gorgan river plain between the eastern Alburz mountains and the southeastern coast of the Caspian sea have Jeitun-like ceramics in their oldest layers. A third site, Sang-e Chakmak is on the eastern side of the mountains in the Šāhrud region near Basṭām. This site consists of a number of small mounds, the westernmost of which had material like that of the Jeitun sites, although it contained only a few ceramic sherds. It yielded a radiocarbon date of 8,300 B.P.

No worthwhile Neolithic site has so far been discovered in southeastern Iran. The northern coast of the Persian Gulf is strongly affected by tectonic uplift. A compact series of orographic ridges narrows where the easternmost extensions of the Zagros mountains merge with the Makran, linking the Iranian plateau to the Indian subcontinent. The Zagros-Makran coastal chain isolates the whole region from any marine influence so that, in spite of its proximity to the ocean, the climate is an arid or continental steppe. Human settlements can be located either on the better watered sections of the piedmont escarpments or along the water-courses; however, they mostly cluster like a bunch of grapes around the deltaic fans.Lack of resources, even of water, is not enough in itself to prevent a region from developing economically. In most cases it speeds up the selective trends towards more sophis- ticated systems of social organization. The technical and political tools required to ensure survival and material prosperity grow with the communities, generation after generation, in a process of adaptation expected to last thousands of years. The control over the desert margin economic complexes of eastern Iran was thus made possible, at least as far as the main branches of its economy were concerned, as early as 5500–5000 and 3500 BC. During this time-span, not only were the material bases of the Neolithic economy consolidated through the selection of the first domestic mutants of wheat and barley in the whole of Central Asia but the pattern was one of sedentary, intensive peopling of rural villages linked to land tenure (250).

Evidence from Afghanistan: Archaeologists from the former Soviet Union were very active in northern Afghanistan in the 1970s. In 1969, 1975 and 1976 A.V. Vinogradov conducted a survey of Balkh, Jauzjan and Faryab Provinces, all bordering the Amu Darya. This work was directed, in part, to locating the sites that might have evidence for early domestication and food production. This survey produced masses of stone tools that are associated with an interesting typology of archaeological locations. This is an area of old sediments and sand dunes, dissected by small streams flowing from south to north.

The 1969 explorations lasted only eight days and produced ca. 700 tools from twelve points. The explorations of 1975 lasted twenty-three days and produced a collection of more than 16,000 stone tools. The final, 1976, survey lasted thirteen days and located an additional 6000 tools. This is a very

rich area. Vinogradov notes: "Practically at any place in the sands in which a brief survey sweep was made flint artifacts and debitage could be found" (5). Another site which is thought to have evidence for early food production is Akli-Mami, near Shortughai, 17 kilometers from the confluence of the Kokcha River with the Amu Darya. Farther east, in the mountain valleys of northeastern Afghanistan and southern Tajikistan, sites of the Hissar Culture, which are thought to date from the sixth millennium BC but there is no evidence of mud brick architecture at the Hissar sites, and no close parallels with the Jeitun Culture are evident.

These sites are all dated by the typology of the flint tools, which carries with it a marked degree of uncertainty. Also, there is no excavation. The work is introduced here to give a sense of the potential of this region to inform us about the subsistence of early Holocene peoples. This goes well beyond the often cited excavations at Aq Kupruk, which seem to have been the abode of pre-neolithic people (5).

Northern Afghanistan was within the natural range of sheep, goats and cattle, as demonstrated by the presence of these wild animals in the Middle and Upper Plaeolithic sites in the region. Later Holocene sites provide even more fascinating data, This material has been reviewed by Jim Shaffer (67), Richard Davis (68) and Singh (69). Louis Dupree’s small scale excavation at the sites of Snake Cave and Horse Cave, on the Balkh River on the borders of Greater Indus Region sheds light on the potentials of this region for understanding the domestication process. The research is preliminary in the sense that the data from these caves have never been fully analyzed and the chronology is based on a relatively small number of radiocarbon dates. Still, the results obtained by Dupree are full of promise.

Snake Cave, also known as Ghar-i-Mar or Aq Kupruk I, is a large cave on a terrace of the Balkh River, near the town of Aq Kupruk, just south of Mazar-i-Sharif. It is a deeply stratified site with close to 10 meters (33 feet) of deposits. It was excavated by Dupree in 1962 and again in 1965. Stratified below historical materials are Dupree's Gravels One, with a "Ceramic Neolithic." This is a soft, limestone tempered pottery which seems to be similar to that from the site of Chust in Turkmenistan, an observation congruent with three radiocarbon dates in the sixth millennium. Below the "Ceramic Neolithic" of Snake Cave is nearly a meter of sterile grey sands which cover an "Aceramic Neolithic." According to Perkins (70) these levels contain the remains of domesticated sheep and goats as well as sickle blades. No reports are available on the paleobotanical material. There is a single radiocarbon date for this level at Snake Cave, which comes to 7586 cal BC, contemporary with a PPNA site in absolute chronological terms. Horse Cave, also known as Ghar-i-Asp or “Aq Kupruk II" was excavated by Dupree at the same time work proceeded at Snake Cave. "Aceramic Neolithic" levels similar to those found at Snake Cave, with sheep, goats and sickles, were also present here and yielded a date which calibrates to 10,035 BC. Chronologically, this would be contemporary with the Early Natufian in the Levant.

Today the range of the wild argali sheep *Ovis ammon* and the Siberian ibex *Capra ibex siberica* extends into the Hindu Kush, whereas the smaller wild urial sheep *Ovis orientalis* and wild bezoar goat *Capra hircus aegagrus* are only found in Afghanistan and north Pakistan further south. The sheep and goat bones from Ghar-i-Asp studied by Dexter Perkins were small (70). Meadows accepts Perkins's conclusion that the wild sheep being hunted from Ghar-i-Asp in the late Pleistocene were argali, but disagrees with his identification of the bezoar goat, suggesting from (admittedly later) horn core evidence that the wild goats were probably Siberian ibex. Sheep and gazelle were also

hunted at Kara Kamar I. There is no information on plant gathering, though there were simple grinding stones at Ghar-i-Asp and wild barley grows in the locality today. The impression is that late Pleistocene settlement here was much as in the Zagros, based primarily on logistical hunting, with little sedentism.

The dates for the "Aceramic Neolithic" material from both Snake and Horse Caves compare well with dates from the Near East. At present, these dates and the archaeological materials themselves, can be seen as good indications that northern Afghanistan, probably the entire western Hindu Kush, should be taken seriously as a place where early, independent experiments with agriculture and animal husbandry may have taken place.

Jim Shaffer (67) and Richard Meadow, however, caution that these finds should be seen as preliminary and that the radiocarbon dates that are available cannot be presumed to constitute the basis for a chronology. Meadow notes that "...based upon current understandings of caprine zoogeography, the ibex *(Capra ibex)* and the urial *(Ovis vigni)* but neither the bezoar *(Capra aegagrus)* nor the argali *(Ovis ammon)* would be present in the Aq Kupruk region". Given the genetic plasticity of sheep, this may not have made much difference to their domestication because the sheep interbreed and bear fertile offspring and the same is true for the goats. In this sense they are not species and one might legitimately wonder if all of the attention given to taxonomic nomenclature, precedent and the like is anything other than an exercise in this discussion. Moreover, we are dealing here with the "modern" distribution of these animals. Whether this is a reflection of their distribution 8,000 to 10,000 years ago is unknown, but has to be held in doubt, given the time involved (5).

In southern Afghanistan the early agricultural culture dating from the end of the fifth to the third millennia BC is the best known. The main settlements were situated inside the fertile and sufficiently irrigated province of Kandahar (Mundigak, Said Qala, Deh Morasi Ghundai). The three features of an early agricultural mode of life, namely, solid mud-brick houses, developed painted pottery and terracotta figurines representing a female fertility goddess or various ungulates, are present in the local material culture. Occurrence of rich copper deposits favoured the development of metallurgy on the territory of Afghanistan. The technique of a closed moulding was mastered not later than the mid-third millennium BC. As in Iran and the Kachi plains of Baluchistan, the economic pattern favored the concentration of population and the emergence of large proto-urban settlements.

Agricultural Development in Regional Context: The evidence for early agricultural settlement, at Jeitun itself and at other sites in the piedmont zone, shows that the Jeitun Culture represents a "developed" neolithic economy, in the sense that both cereal cultivation and caprine pastoralism were well established and the settlements were small (2 ha) farming villages, most (if not all) of which were probably occupied throughout the year. The sites with evidence of Early Jeitun occupation cluster near the outer margin of the western piedmont, whereas the sites situated on the eastern piedmont lack such evidence. This appears to indicate an eastward spread of agricultural settlement during the sixth millennium from Early to Late Jeitun times, although this assumption must remain tentative in the absence of well dated sequences from most of the known sites and because other early neolithic sites may have been buried by more recent alluviation. Nevertheless, the fact that *all* the known Early Jeitun sites are in the western piedmont strongly suggests that the antecedents of the Jeitun Culture should be sought to the west and south of the piedmont rather than to the east (56).

Harris and Gosden emphatically state that “We can be confident that the cultivation of einkorn and

emmer wheat did not begin independently on the western piedmont, by means of local plant domestication and without any external influence, because the areas of origin of these wheats, both of which were cultivated at Jeitun, lie farther west within the distribution areas of their wild progenitors, respectively" (56). Their basis for this statement is the present-day absence of any 'wild progenitors' in this area. As discussed earlier, this basis has been shown problematic in assessing the origin and spread of agriculture and pastoralism in West, Central and South Asia. According to Harrris and Gosden, barley too was introduced from farther west as an already domesticated crop, although its wild progenitor, *Hordeum vulgare* subsp. *spontaneum*, is known to occur in northern Iran and southern Turkmenistan, even as far east as the western Himalayas and Tibet.

Again, "Goats, too, could have been domesticated locally, because Jeitun lies within the natural range of the wild bezoar. However, it is very unlikely that sheep were, because the urial is not regarded as a direct ancestor of domestic sheep, which are believed to derive from the Asiatic mouflon, *Ovis orientalis*, the natural range of which extends from Asia Minor eastwards as far as the Elburz Mountains, where it intergrades with the urial, but not into Turkmenia. Furthermore, the fact that the remains of domestic sheep and goats have been found at neolithic sites of the seventh and eighth millennia farther west in Iran, Syria, Turkey and the Levant, and that the smaller domestic forms are present at Jeitun in all the excavated levels, argues for their introduction into southern Turkmenia from the west as already domesticated animals". The argument, nonetheless, seems circular. If the argument is photoeographical, then the domestication of sheep and goats cannot be excluded in this region.

"The admittedly meagre archaeological evidence of early neolithic sites with Jeitun-like features in northeastern Iran, and the fact that domesticated einkorn and emmer wheat, and probably barley, as well as domesticated sheep and goats, derive from farther west, suggests that the development of an agro-pastoral economy in the piedmont zone of southern Turkmenistan resulted from the spread of most - perhaps all - of the elements of the neolithic agricultural economy that had been developed earlier in western Iran, the middle Euphrates Valley, Anatolia and the Levant" (56). And, "on present evidence, we cannot determine whether this process was essentially one of primary demic diffusion, whereby migrant agriculturalists colonized the piedmont zone from the southwest, or whether it occurred more by secondary diffusion involving the selective adoption of domesticates and agricultural techniques by resident mesolithic populations (56)"

"The fact - which is strongly reinforced by the archaeobotanical evidence from our recent excavations at Jeitun referred to above - that the Jeitun Culture first appears in southern Turkmenistan as a "developed" neolithic economy appears to favor the former interpretation", argue Harris and Gosden (56). It is a typical example of the Childean way of thinking that agriculture, indeed the civilization itself, originated in the Near East and from there spread to the west and the east. Such a view is not supported by recent regional data which tend to speak for an "expanded nuclear area" or a wider "interaction zone'.

Modern day precipitation at Jeitun, Anau, and Gonur is under 230 mm/year, which is low for reliable dry-farming of cereals. All three sites are, however, well-situated to take advantage of surface water using traditional small-scale irrigation methods. These technologically simple systems provide the model for reconstructing ancient agricultural practices. Along the foothills of the Kopet Dag, irrigation depends on gravity flow, with agricultural fields situated along alluvial fans which extend into the arid zone from rivers originating in the Kopet Dag and Pamir mountains. Because these

systems are spatially limited by accessibility to the inland river deltas, they form the basis of the "oasis civilizations" of the Bronze Age.

Conclusion: At the beginning of this chapter we compared the piedmont zone of southern Turkmenistan, between the Kopet Dag range and the Kara Kum Desert, with the two other great physiographic boundaries of the Iranian Plateau - the hills of Baluchistan and the Zagros Mountains which overlook, respectively, the valleys of the Indus and of the Tigris-Euphrates, reps[octavaly. All three are major resource-rich ecotonal zones between upland and alluvial lowland, and in all three there is evidence of early neolithic agro-pastoral settlement. Along the western boundary of the Iranian Plateau, in the eastern "hilly flanks" of the socalled Fertile Crescent, this evidence dates back, at such sites as Jarmo, Ganj Dareh, Tepe Guran and Ali Kosh to the eighth and the first half of the seventh millennium BC.

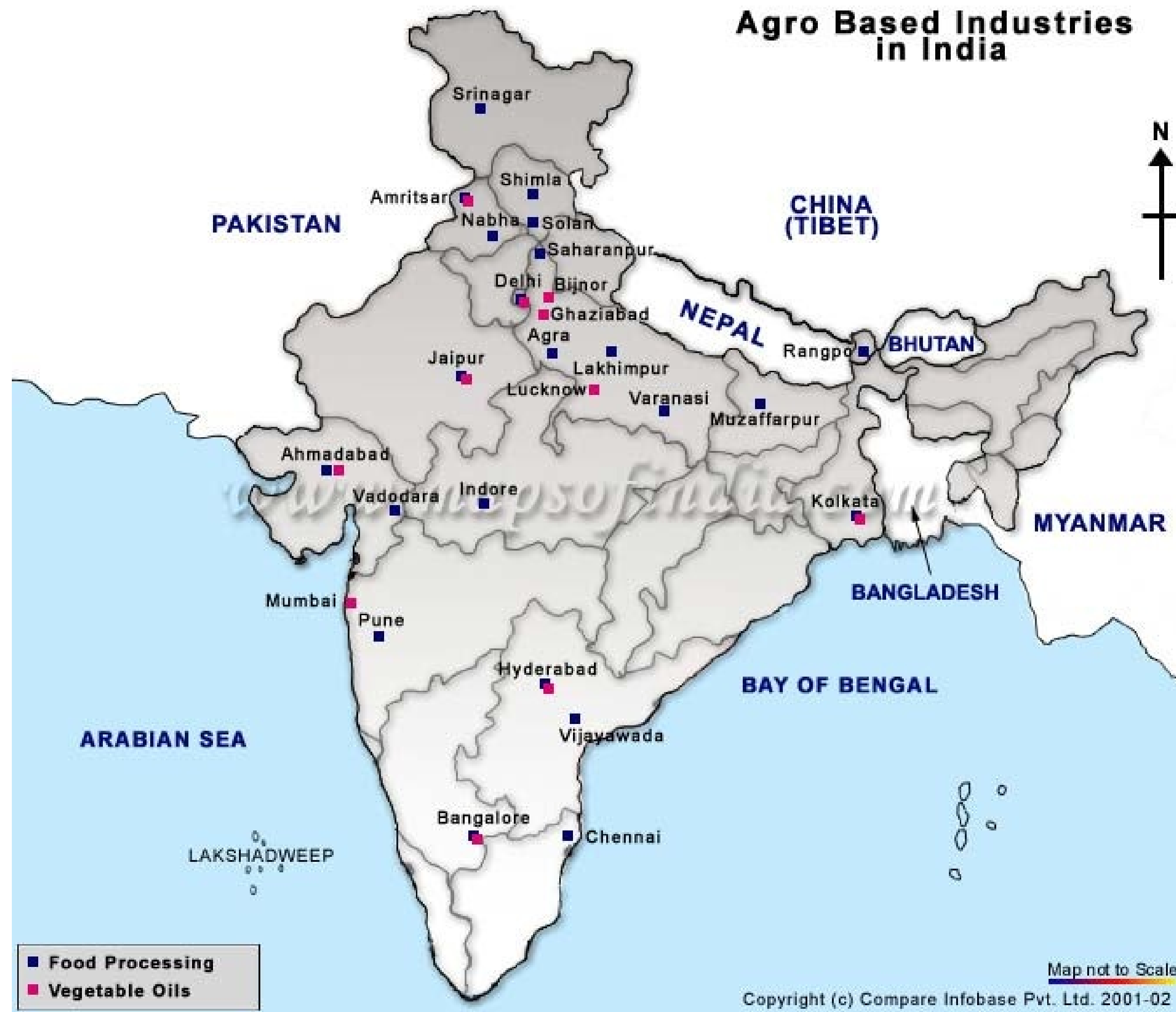
On the eastern edge of the Iranian Plateau, the site of Mehrgarh has provided the earliest evidence of agro-pastoral settlement in the South Asian subcontinent, and it demonstrates that a transition from primary dependence on hunting and gathering to agriculture had taken place at the southeastern margin of the Iranian Plateau by the beginning of the seventh millennium, just as it had along the northeastern margin in southern Turkmenistan and the western margin in the Fertile Crescent.

When the early agricultural Jeitun Culture of southern Turkmenistan is viewed in the wider context of neolithic Southwest and western Central Asia, it is not seen as a secondary region of agricultural development but as one of three piedmont zones around the Iranian Plateau in which neolithic agro-pastoral economies became established during the eighth and seventh millennia BC. It is clear that the three piedmont zones did not develop in complete isolation from one another, but we still have much to learn about the relative importance of diffusion and autonomous development in the transition to agriculture in each of them.

The story of the Neolithic in Iran is largely a story of western Iran - an integral part of the socalled Fertile Crescent. A large number of early agricultural settlements have been found in this area, where the presence of emmer wheat and barley has been noticed. Sheep and goat bones are commonplace. There are also a few aceramic Neolithic sites, dating as early as 8^{th} millennium BC. A few Neolithic sites have been found in the Northeast; they have strong affinity with Jeitun culture of southern Turkmenia. Practically no early agricultural site has been discovered in southeastern Iran but late Neolithic sites are quite a few.

Afghanistan's Neolithic story is still to be told as there has been only few studies undertaken so far. There is, however, strong evidence in northern Afghanistan for early Neolithic developments and for mature agricultural villages in southern afghanistan, around Kandhar. All these sites have strong relevance to developments the Indus Valley, both during the spread of agriculture and the onset of the Harappan Civilization.

IV.3. Advent of Agriculture in India



The prehistory of food production in India remains extensively documented but poorly understood. Whereas archaeological syntheses have traced the regional developments and interregional influences in material culture, the equivalent

understanding of agricultural systems remains rudimentary. One of the reasons is that most of the investigations are regional in character, showing rarely any connection with the surroundings. The other is a rather casual approach of most of the Indian archaeologists and archaeobotanists to data collecting and reporting. Although efforts at systematic recovery of plant and animal remains are becoming more widespread in India, much data comes from haphazard sampling or is reported without information of sampling strategy or sample sizes. As a result, internationally peer-reviewed reports are rare. The most annoying factor is the general tendency of these authors to put archaeology in the service of 'nation building' instead of considering it as a contribution to knowledge in the service of humanity at large. A tendency of one-up-manship is quite evident in the available reports.

This chapter is largely based on the research work conducted over the years by Dorian Q. Fuller and reported extensively in peer-reviewed journals and edited books (70-80). Bridget and Raymond Allchin are two other synthesizers of archaeological data and their book, *The Rise of Civilization in India and Pakistan*, very well summarizes their take. Vishnu-Mitre is another noteworthy researcher who has frequently published in recent years. The problem of all of these authors, along with several other, is that in order to keep their myth of the deep antiquity of "Indian civilization" alive, they

routinely extrapolate the experience of the Indus peoples to the continental India. Since it cannot be done on factual or theoretical grounds, they end up in a confusion of great proportion or creation of something non-substantial.

Compared to the Fertile Crescent, Iran, Afghanistan, and Southern Turkmenia, described so far, and Pakistan, to be discussed in the next chapter, the peninsular India is much different and these differences cannot be easily ignored. Even Raymond and Bridget Allchin, two champions of the antiquity of ‘Indian Civilization’ concede as much:

“We must now consider the situation in South Asia east of the Indus system and the Thar desert. In earlier chapters this part of the subcontinent has been shown to consist of a number of geographically distinct regions which, while presenting a range of different environments, taken as a whole have certain overriding features that contrast with the north-western third of the subcontinent [meaning Pakistan]. The western borderlands, Indus plains and the Thar desert, are all part of a major arid region where agriculture at all periods is almost entirely dependent upon water carried by rivers and streams whose principal catchment is outside the region. Moving east or south of the Indus system we enter more hospitable zones of higher monsoon rainfall which lend themselves to more variety, less specialized forms of exploitation by man, anciently and at the present time” (59).

Agriculture and animal husbandry in Pakistan was the result of neolithic developments over a large and mutually interacting cultural zone, constituting the Near East, Iran, Afghanistan, southern part of Central Asia, and Baluchistan, an area that has been aptly called the Middle Asian Interaction Zone. Peninsular India took no part in these developments and was largely a recipient of already domesticated plants and animals.

There is also the question of starkly different temporal horizons. Agriculture and animal herding in Baluchistan, along with several other points in the ‘hilly flanks‘ of the Iranian Plateau, began *ca*. 7000-8000 BC. By the fifth millennium BC large village farming communities were settling the Indus plains and by the mid third millennium BC this region was experiencing a full-fledged urban civilization. The beginning of the Neolithic in India is of much later dates - not earlier than the second or at the most third millennium BC. It was during this time period that some early communities east of the Thar Desert appear to have adopted the practice of keeping domestic animals, and it is probable that certain of them had also begun to practice small scale agriculture (59). This situation underlines the fact that the continental India largely remained outside the pale of what we call the Neolithic for a long period of time, some communities even up to the onset of the Iron Age in the first millennium B.C. At the time when the greater Indus Valley was in the throw of urbanization, the communities across the Thar and the Divide had neither permanent settlements, nor any significant agricultural development; hunting, gathering and fishing was the way of life. It is thus misleading to study the beginning of agriculture in India in context of Pakistan. India has its own trajectory of neolithic developments and its own chronology.

We should also consider food production in terms of both animals and plants, ceramic production, and sedentism. In this context, the archaeozoological evidence is as important as archaeobotanical. Enough information on both of these accounts is available but what is lacking is the temporal horizon. It seems that in every case it becomes a bone of contention, often with political and ultranationalistic overtones. This situation sometimes gives rise to such absurdities as the claim (VishnuMitre) that rice was being cultivated in the GangaJamuna Doab by seventh millennium BC!

Looking at the broader picture, the Neolithic changes in India started to take place in the third millennium BC in the borderline areas of Gujarat and the Divide and in the second millennium BC in the peninsula. The evidence to date is slight and what is known is generally massaged for the purpose of building national pride. Nevertheless, we shall try to briefly describe the available information as best as we can.

As is clear from the discussion in Section III, certain regions of the Old World are candidates for hearths of pristine origins through the domestication of native species while other regions must have received agriculture or pastoralism secondarily, either through migration (demic diffusion) or adoption (cultural diffusion). On the basis of these criteria or sources of evidence, there is presently a general agreement among archaeologists and prehistorians that India received the "West-Asian" crops (barley, wheat, chickpea, lentil) and domesticated animals (goat, sheep, and cattle) from Pakistan; the pig, chicken, and probably rice from South-East Asia; and African millets from East Africa through Oman or through the coastal Sindh and Kutch. There were, of course, some pulses, and probably rice, which were internally domesticated and made part of the local subsistence regimes, concurrent with the adoption of the western package. Thus, the advent of agriculture in India, although to some extent reflecting local conditions, is to be understood against the background of agricultural growth in the Indus Valley and Southeast Asia (81), not in the Iranian plains or the Fertile Crescent in the West.

A combined presence of wheat, barley, cattle, sheep and goat domestication spread first in an area extending from the Punjab in the northwest to Uttar Pradesh in the northeast of Pakistan and to Gujarat in the southeast. It took another 3000 years before it eventually reached southern Peninsular India (75). Neolithic communities in India did not start on empty ground. Cultural complexes belonging to a comparatively short Mesolithic episode developed from the preceding Middle and Upper Palaeolithic cultures and continued to exist through the Neolithic, Bronze and Iron Ages, with microlithic tools continuing in use here and there in some communities even today.

The role of the indigenous domestication was very limited and was confined to certain pulses in the South and probably rice in the North. India's role on global level was important to the extent that the cultivation of certain pulses, raising of chicken, and probably rice and water buffalo were transmitted to Pakistan from which they also found home to the lands in the West. Thus, for the purpose of investigation of agricultural origin and spread in India, one should start with viewing India as a receiver of agriculture and domesticated animals from outside, barring some pulses which may have been locally domesticated. In this connection, Pakistan could be viewed as the provider of the western package of seed crops and domesticated animals and a receiver of some eastern pulses or perhaps rice. The debate about the original sources of acquisition of these crops and animals in the first place by either region is superfluous; it only adds to confusion without adding anything tangible.

This review of the beginning and spread of agriculture in India covers three main areas: 1) Agricultural packages and their sources, 2) The mode of agricultural dispersal to and within

India
3) The geographic distribution of domesticated
plants and animals.
Sources of Crops in India: Although a full review of the phylogenetic and biogeographical evidence relating to the sources of crops in prehistoric India is beyond the scope of this chapter, at least five

main geographical group crops (and fauna) need to be considered:

1. *Indus crops:* The crop package of wheat, barley, lentils, chickpeas/gram, peas, grass pea, and flax-linseed, the "founder crops of South-West Asian agriculture" was well established in the Indus Valley by the time of the Harappan Civilization and was being introduced to the neighboring regions of India, largely after the third millennium BC. It remains, however, to be clarified whether or not these crops came to India together or whether some of the crops diffused separately over a much longer period. In addition to cereals, pulses, and flax, domesticated animals also entered India from the Indus Valley, most notably sheep, goats and zebu cattle. The jury is still out for water buffalo.

2. *African crops: Jowar/*great millet *(Sorghum bicolor*), *ragi/* finger millet , and *bajra/* pearl millet are important although some other types of millets were also grown. From the South Asian perspective these crops share African origin, they in fact have different regional origins within Africa and we would therefore expect potentially separate routes and periods of entry into India. Indeed, these crops appear in a somewhat piecemeal fashion in various parts of India from the early second millennium B.C., presumably spreading via the Indian Ocean or the Arabian Sea. There is also a strong possibility that these crops, like the "South-Western" package, diffused into India from coastal Sindh and Makran, the area that had already developed a coastal contact with Oman, Yemen, and probably even with eastern coast of Africa on one hand and Kutch and coastal Gujarat on the other.

3. *Chinese and Central Asian Crops*: Common foxtail millet and hemp can be mentioned. These are probably of Chinese origin. As with the African crops, these two species do not form a coherent package and may have had separate geographic origins, with possible second domestications in southeastern Europe or the Caucasus. Foxtail millet cultivated in India today seems to derive in part from both Chinese and European genetic stock. This is likely to have reached India via northwest Pakistan, perhaps as early as the Harappan period although the clearest evidence is from the Late Harappan period (after 2000 B.C.).

Rice, although domesticated at least once in South/Central China, must be considered separately because of its tropical origin and the possibility that it was domesticated a second time in India. Meadow suggested that rice also might have come to India through central Asia-Afghanistan-Indus Valley. Its cultivation in Swat before any credible evidence of cultivation anywhere in India can be cited as an indication.

Rice (Oryza sativa) is one of the most utilized crops of the world today, but the complexities of its early history remains largely unraveled. Rice is now cultivated in a wide range of habitats from temperate northern China and Korea to the tropical areas of Indonesia. It is grown as broadcast sown crops on hillsides, often as part of extensive slash-and-burn systems, and it is grown in highly labor intensive, flooded 'paddy' lands in which seedlings grown in one paddy are dug up and individually replanted into another field. The assumption, which is widespread in the literature, that all Asian rice derived from a single domestication, somewhere in the wild rice belt from eastern India across northern IndoChina or South China, has been based more on the presumption of single origins for crops in general, coupled with problematic archaeological inferences. Starting with the assumption that rice was domesticated once, there have been some rather extreme attempts to relate East Asian and South Asian archaeology, such as via comparisons between Neolithic China (sixth through fourth millennium BC) and Neolithic Kashmir (2500-1000 BC), even though the latter had agriculture based on Near Eastern crops (wheat, barley, lentils and peas) and not rice! More recently, Kharakwal et al.'s (2004) attempt to link cord-impressed ceramics with rice agriculture suggests hyperdiffusionism based on superficial similarities in ceramics, including the Jomon of Japan (which is non-agricultural), parts of Neolithic China of the early to mid-Holocene, and much later 4th to 2nd millennium BC material from the Ganges. All such hyperdiffusionist studies are flawed, not only

because they stretch archaeological logic by drawing comparisons across such vast areas and timespans, but most importantly because they fail to take into account what we already know from botany about rice origins (73). Historical linguists have been mistaken in trying to make sense of a vast array of potential rice words on the assumption of a single centre of rice origin from which such words ought to originate. Less explicitly reasoned attempts to link all of South and East Asian rice into a single story, are the grand narratives linking agriculture and language spread, in which the spread of rice from the middle Yangzi to India with demographically expanding and migrating farmers is argued largely on the basis of model assumptions rather than archaeological evidence. Any attempt to make a single narrative about Asian rice is already falsified by phylogenetic evidence from rice itself. Asian rice, despite being lumped under the species name, Oryza sativa, is composed of two distinct phylogenetic species, indica and japonica. This has long been suggested by plant breeding research, in which hybridization between these two cultivars is found to be difficult and imperfect, with the majority of crosses between indica and japonica cultivars being wholly or partly sterile. As a result, the botanical literature has had a persistent debate between hypotheses of rapid divergence after a single origin or two domestications (73), although it is the single origin that has tended to be assumed in archaeological syntheses. There now is substantial evidence for genetic distinctions between indica and japonica from a range of data. The available archaeological evidence also suggests two distinct centers of early rice cultivation. In China, despite continuing controversies about the antiquity of rice use, cultivation, and domestication, it is widely accepted that rice cultivation was underway in the Middle Yangzi, and adjacent South China by the sixth millennium BC. While rice spreads down the Yangzi river and northwards into parts of central China, and probably the Shandong peninsula during this early period, archaeological evidence from further north, south or the upper Yangzi post-dates 3000 BC (see Figure 2). In India, rice cultivation is quite widespread by ca. 2500 BC from the eastern Harappan zone in the upper Ganges basin and the Swat valley in northern Pakistan (153). A few sites with evidence for rice impressions in pottery (not necessarily domesticated) date back to the fourth millennium BC, while recent excavations at Lahuradewa have been suggested to put rice cultivation back to as early as ca. 7000 BC, based on an AMS on a piece of a charred mass of rice. It must be cautioned, however, that criteria for recognizing domesticated rice as opposed to wild gathered rice remains weak and unsubstantiated, and the evidence for cultivation practices is clearly absent. While the cultivation of rice at that early date is hyperbolic, the evidence indicates at the very least that foragers were exploiting wild rice in the Ganges plain from ca. 7000 BC. It is after the first half of the third millennium BC when rice had spread towards the northwest in the first half of the third millennium BC, indicated by finds at pre-Harappan Kunal and at Ghaleghay in Swat. Whether early rice cultivation in Eastern India (e.g., Orissa) should be seen as dispersal from this same centre or a separate process, perhaps rather later, requires further archaeobotanical investigation.

4. *Northeastern Introduction:* The *moth* bean *(V. acontifolia*) and possibly black gram *(Vigna mungo L.*), as well as fruits and vegetable crops such as cucumbers *(Cucumis sativus* L.), the ivy gourd *(Cocciniagrandis* (L.), and *Citrus* fruits are either of local north-eastern Indian origins or introductions from south-eastern Asia. Some archaeobotanists think that probably rice is also an introduction from this region.

5. *Peninsular domesticates:* Horsegram , mung *(Vigna radiate),* Pigeon pea *(Cajanus cajan)*

of secure and varied agriculture including familiarity with a wide range of pulses, tubers, vegetables, and fruits, presupposing a complex and rich vista of agricultural history and development. Millets seemed to have initially concentrated in Gujarat and wheat and barley in the Gangetic plains.

Animal Domestication: The region defined by the borders of modern India contains a number of

domesticable wild animal species, as well as a long record of human habitation. These factors have led some scholars to distinguish India as a hearth of domestication where, at various points in time, local taming/and/breeding of cattle, buffalo, elephant, horse, camel, sheep, goat, pig, dog, and fowl took place (82). These pronouncement have,



Pearl Millet (*Pennisetum glaucum*) - a staple in large parts of Gujarat

and some minor millets can be included in this general category although no definite evidence is available to that effect.

In summary, out of the four staple crops which are currently cultivated in India, that is, wheat, barley, rice, and millets, the evidence is unambiguous in the case of barley and wheat that they come from the Greater Indus Valley. The data is more ambiguous in the case of rice and the different varieties of millets. Millets occur as early as the Mature Harappan period in Pakistan or in some cases even in the Early Harappan period, which means that their center or centers of origin need yet to be determined. Despite a host of claims for an early cultivation of rice in India, no center is yet precisely located: a Chinese origin, a Central Asian origin, or even a second domestication within India are all possibilities. By the 2nd millennium BC, the major agricultural areas of India were within the fold until very recently, remained pure speculation. Indeed our data for animal domestication within India are so poor that even today no comprehensive review has been attempted.

Richard Meadow's pathbreaking work on domestication in Baluchistan makes a good case for local domestication for zebu cattle and sheep by 6000 BC (see the next chapter). India has not yielded any site of that antiquity for which solid evidence of herding is



Foxtail millet (*Setaria italica*), common in south India, is probably of Chinese origin



Jowar (sorghum bicolor (L.) is a common fodder crop all over India

several this dearth of evidence. The most obvious is that until recently there simply was not much

interest in the study of faunal remains from the archaeological sites. In pre-Partition days Sewell and available. By 4000 BC

there are hints of herding scattered through the archaeological record, but widespread indications of controlled husbandry cannot be found until the late third millennium BC. This is long after most of economically useful species assumed their modern forms and behaviors in neighboring regions of South Asia, more particularly in Pakistan.

Thereare reasons for Guha (1931) and Prasad (1936) wrote reports of the fauna recovered from the third millennium cities of Mohenjo-daro and Harappa; reports from subsequent excavations of fourth and third millennium sites offered only brief summaries of species recovered, and occasionally included bone counts. The flurry of interest in animal domestication and early husbandry fostered by the Economic Prehistorians and New Archaeologists of the 1960s nearly passed India by. Certain scholars showed some interest in Indian fauna at that time, including Julliet CluttonBrock, Caroline Grigson, and the Alchins; Sir Mortimer Wheeler on the other hand devoted only a paragraph to the subject in his classic guide to the Indus Civilization.

Faunal research, when initiated after 1960s was conducted in a casual way. Comparative collections were compiled only rarely, specialists were drawn from the ranks of zoologists and veterinarians with no formal archaeological training, and standard of recording and publication were, as it became a characteristic of Indian archaeology in generel, low. Thus, much of what has been said about domestication in India either cannot be substantiated or is unreliable (83).

Thisstateofaffairsbegantochange somewhat in mid 1970s when a series of papers began to appear, a few in peer-reviewed journal but largely in local publications. These publications have illuminated our understanding of the history of animal domestication but there is still nothing to compare in age or quality with the carefully documented Mehrgarh assemblage. No reliable sequence of faunal collections exist that exhibits a transition from hunting to herding, whether through morphological change, alliteration of slaughter patterns, or the appearance of animals far from their natural range.

A good example of the problem is provided by the important ‘mesolithic’ site of Bagor in southeastern Rajasthan. Shah initially examined the faunal remains and suggested that only wild animals were exploited, at least in Phase I (somewhere between 5000 and 2800 BC). Alur subsequently studied part of the collection and identified sheep and goat as the most commonly represented taxa and domestic cattle as being present. Finally, Thomas added water buffalo to the list and continued to insist that domestic sheep/goat were the most frequently occurring forms in all periods.

This identifIcation of sheep and goat (and to a lesser extent cattle) at Bagor in particular, but also at other similar sites, has led to the suggestion that domestic animals were adopted quite early by nonagricultural peoples who thus became ‘hunterpastoralist-gatherers’. The fact that Shah identifIed only wild taxa has never been fully discussed and brought to fore. In fact, no complete or even partial report by her own hand ever appeared.

An Outline of Indigenous Domestication: Many early reviews of the origins of India’s agriculture lacked the modern botanical data to localize the sources of domesticates as well as the archaeobotanical record to trace their spread. Since the application of sieving and flotation in Indian archaeobotanical sampling, the evidence of ancient crops has increased dramatically. These data still need to be critically assessed in relation to the probable regions of domestication in order to

understand the relative contributions of local domestication and external adoption. In the following we attempt to review the available data although in Indian context it is quite difficult, if not impossible, to discern facts from fiction.

Unlike the Near East and Mediterranean, for which Zohary and Hopf are an authoritative source, there is nothing equivalent for South Asia. Various botanical reference books contain information, but it is often of variable quality and reliability, and critical botanical reassessments are necessary for many species.

Although Vavilov had recognized an ‘Indian Center of Origin’, he really meant by it the Baluchistan. In general, India is still disregarded as a possible center for major independent domestications. There are numerous crop species that could derive from native Indian species, but these crops are rather minor and regional. A recent tabulation of such evidence is provided by Fuller (75) for some pulses and selected other crops in India, and possible areas of their domestication, notwithstanding the fact that for many species renewed research is needed. In the followings, we attempt to review this evidence. The reader must, however, keep in mind that these opinions are at best tentative. A second point to note is that the beginnings of agriculture in India came at different times in different regions and thus drawn out over at hundreds of years.

The case for a Gujarati Center of Agriculture Development: Gujarat is likely to have been a center of the domestication of local, monsoonadapted crops. Archaeobotanical evidence for the beginnings of cultivation in this region is not yet available, and the earliest ceramic bearing sites, of the Padri and Anarta traditions (*ca.* 3500–2500 BC) have so far not yielded plant remains. Nevertheless, these sites have produced evidence for some domestic fauna, including directly dated cattle bones from the fourth millennium BC from Loteshwar and probable domestic fauna from Padri and Prabas Patan. Other sites, such as Bagor (In Rajasthan, in the north of Gujarat), which are often cited as evidence for adoption of livestock by mid-Holocene hunter-gatherers, need archaeozoological reassessment in light of a refined understanding of the difficulties of separating sheep and goat from blackbuck antelopes. While livestock are being adopted into this region, it is plausible that ceramic bearing sites in the wetter Saurashtra, as opposed to the desert fringe sites, were sites of communities of cultivators. In the Mature Harappan period (from 2600 BC), a period from which systematic archaeobotanical evidence is available, a stark contrast can be drawn between millet-dominated agriculture of



Horsegram is quite popular in south India but practically unknown elsewhere in South Asia

Saurashtra and wheat-barley-winter pulse agriculture of neighboring Sindh.

Despite being a region generally included in the Harappan sphere, Saurashtra shows a very different agricultural system from the Indus Valley. In part this can be attributed to local ecology since Gujarat lacks the perennial irrigation of a major river and instead must rely on monsoon rains - to which

the summercultivated millets are better suited. Although sites such as Rojdi and Kuntasi which date to the Mature Harappan phase have extremely limited evidence for wheat and barley in a few samples,

the ubiquitous and dominant species are tropical millets. In addition, pulses from the earliest phase at Rojdi include *urd*, which could be native here, or the adjacent zone from the northern Western Ghats to the Southern Aravalli Hills. By contrast, *mungbean* must have diffused from either the peninsula (Southern Neolithic) or from the north (the Eastern Harappan zone), after 2000 B C . H o r s e g r a m also occurs first in this later time horizon.

While there have been controversies over identification of millets in this region, it is clear that at the beginning of agriculture native Indian small millets were predominant (71). The spread of its cultivation was, however, a gradual and slow process; it was characterized not by the steady 'wave of advance' predicted by colonist migration models but rather by 'punctuated explosive dispersal'. Barker (25) has argued that the dominant process for agricultural dispersal was the acquisition of domesticates by indigenous foragers at different rates and in different ways. Contrary to an ongoing cultural relationship of Gujarat with Sindh since the Early Harappan period, the archaeobotany of Gujarat was much more peninsular in character, suggesting a tradition of cultivation distinct from that of the Indus Valley. Its roots plausibly lie in the hunter-gathering populations similar to that of the Southern Neolithic people.

Old reports of rice husk impressions in pottery or mud clods, as at Rangpur and Lothal, and Ahar in Rajasthan, were taken as an evidence of rice cultivation but later on shown to be of questionable interpretation; these conclusions have not been corroborated by macro-remains from systematically sampled sites. While the identity of the *Oryza* genus is not in doubt, evidence does not clearly indicate whether it was wild or cultivated. Evidence of Oryzoid phytoliths from Balathal raises a similar problem, and could be explained by the assumption of an extensive distribution of wild rice distribution in these regions. This distribution area severely contracted as the wetter Holocene came to an end. This problem requires renewed investigation, together with further informed debate over whether rice in some contexts may be invisible in the charred archaeobotanical record but present as phytoliths, or ceramic impressions.

In south India the earliest date for cultivated rice is around 1400 BC, probably after its domestication in the northern plains. Cultivated rice is first mentioned in the Yajur Veda (ca. 1500-800 BC) and then is frequently referred to in other Sanskrit texts. We shall leave here the debate on the domestication of rice in South India to itself as it has no relevance to Pakistan.

A Gangetic Center of Origin? The Gangetic plain is frequently mentioned as a potential center of indigenous domestication of some pulses and rice, even some millets. On biogeographic grounds there is evidence for a wild progenitor of several crops in the region and it is assumed that this may have provided a substrate for the domesticated cultivars. Rice is particularly mentioned as a domesticate in this region during the third or even fourth millennium BC. Chakrabarti and some other Indian archaeologists have gone as far as the seventh millennium BC (probably on the authority of Vishnu-Mittre) for the domestication of rice in Belan region of central Gangetic valley but it is hard to understand how a complicated crop like rice could have developed in the Gangetic Valley at a time when there is no sign of domestication of any other plant in the whole of India. More recently, Kharakwal et al. attempt to link cordimpressed ceramics with rice agriculture, suggest



Plants of mungbean, native to South India but widely grown in all of South Asia

ing hyper-diffusionism based on superficial similarities in ceramics, including the Jomon of Japan (a non-agricultural society), parts of Neolithic China of the early to mid-Holocene, and much later 4th

to 2nd millennium BC material from the Ganges. All such hyper-diffusionist studies are flawed, not only because they stretch archaeological logic by drawing comparisons across such vast areas and timespans, but most importantly because they fail to take into account what we already know from botany about rice origins.

Livestock are also claimed to be adopted at around this time. Furthermore, it has been hypothesized that when wheat, barley and lentils diffused from the West (the Indus Valley) they were adopted into already established systems of cultivation. None of these conclusions are, however, based on any archaeological evidence. There is no evidence of seed agriculture in the Gangetic plains before the introduction of barley, wheat, and lentil prior to 2500 BC. The evidence from the Divide cannot be generalized and extended to the whole region to the east.

At the site of Mahagara, south of Allahabad on the Belan river, the adoption of these crops occurs *ca.ca.* 1700 BC, whereas further north and east at Senuwar this adoption occurred perhaps *ca.* 2200 BC. Recently directly dated barley from Damadama is ca. 2400 BC, while from new research at Lahuradewa, it occurs in Phase 2, 2500-2000 BC. The crop that is consistently present at all these sites from the earliest phases is rice, although small millets are also consistently reported. Native Indian pulses are also present, especially *Vigna radiata* and *Macrotyloma uniform* but this does not necessarily mean their domestication in this region.

An important set of crops which is native to northern India, but still poorly documented are cucurbitaceous vegetables, including cucumbers (*Cucumis sativus*), snake gourd (*Trichosanthes cucumerina*), bitter cucumbers (*Momordica* spp.) and ivy gourd (*Coccinia grandis*). Linguistic evidence for


Rice (*Oryza sativa* L.) plant, widely grown in India and probably domesticate there

these species may be indicative of borrowing from an extinct agricultural language of northern/ Gangetic India. Although *Cucumis* sp. seeds have been reported fairly widely, specific identity remains elusive, and several wild species are possible. *Coccinia grandis* has been recovered from

Hulas in the upper Ganges basin from 1800–1300 BC, and from Senuwar IB, *ca.* 1750–1300 BC. Evidence from the upper Ganges valley and the middle Ganges, as at Senuwar, indicates that by the early second millennium BC some crops of African origin had been

adopted in the region, including hyacinth bean, cowpea and sorghum, while evidence for pearl millet and finger millet is absent before the late second millennium BC.

The domestication of rice in northern India is possible but still enigmatic. Rice was domesticated at least once in Yangtze basin of southern China, although clear archaeobotanical evidence for when this occurred remains elusive. Some would tie early South Chinese rice to a hypothetical ‘Austric’ package that dispersed by migration into northeastern India with the Austro-Asiatic (Munda) languages, but several others do not subscribe to this scenario. This hypothesis of rice dispersal is contradicted by evidence for multiple rice origins. The current genetic evidence is clear in indicating a minimum of two domestications for *Oryza sativa*, with the second domestication of *indica* cultivars conceivably in the Gangetic basin, or eastern India.

Several issues require clarification before the emergence of agriculture in the Gangetic basin can be understood or even accurately outlined. Sedentary agriculture is indisputable from at least the mid/late third millennium BC, but what is at issue is the beginnings of sedentism, the beginnings of ceramic production, and the transition from foraging on wild rice to cultivation and appearance of morphologically domesticated rice. Systematic sampling and direct AMS dates are needed, to clarify the antiquity of rice and pottery, and further botanical research is needed to produce replicable criteria for determining wild vs. domestic status. What is clear from the evidence at present is the end of the process of agricultural origins in this region, as rice/millet/pulse-cultivating sedentary villages with domestic live-stock become widely established in the early second millennium BC. Many of these sites consistently show later continuity into the Chalcolithic assemblage in the mid second millennium BC. Interestingly, this is precisely the time period when some “Aryanized” Indus tribes started to move into the Gangetic plains through the IndoGangetic Divide.

Also intriguing about this region, and requiring further research as well as theorization, is the possible persistence of communities alongside Mesolithic sites are known in the region, especially in the region north of the Ganges river. The first of these sites to be reported in any detail was Mahadaha, where Alur had reported an entirely domesticated fauna and where radiocarbon dates suggested early second millennium to later third BC age. It was on the basis of this apparent overlap with Neolithic sites south of the Ganges in the Vindhyan zone that Possehl and suggested an interaction between hunter-gatherers. Subsequent consideration of the fauna strongly suggests misidentification of entirely (or mainly) wild fauna. Intriguing amongst the fauna is the significant presence of *Gallus* bones, which could relate to the origins of chicken keeping, as early chicken remains have also been reported from Mesolithic Mahadaha. In addition to the faunal data, analysis of human skeletal remains point to a broad-based hunter-gatherer adaptation.

Eastern India: Early agriculture in eastern India (Orissa) is still largely unknown. As has often been discussed, this region has widespread populations of wild rice. The native millets and Vigna pulses could also be domesticated in this region, as could the north Indian cucurbits and the tuber crop taro (*Colocasia esculenta*). Uniquely wild in this region is the pigeon pea (*Cajanus cajan*). At present the main excavated sites are late Neolithic mounds from the coastal plains or the Mahanadi River valley, such as Golbai Sassan, Gopalpur and Khameswaripalli established by the end of the 3rd millennium

BC or during the 2nd millennium BC. These sites probably relate to the settling down of already agricultural populations, but the earliest phases of agriculture in this region are yet to be documented archaeologically.

Archaeobotanical evidence from the later and better established phases of Gopalpur and Golbai Sassan (after 1500 BC) indicates cultivation of rice and native pulses (mung, urd, horsegram and the local pigeonpea). Small millets are present but these may occur as rice weeds or subsidiary crops. A single winter crop, lentils, is present indicating a contrast from the Ganges where a wider range of winter crops is prominent. The available faunal data indicates domestic fauna (including bovines and caprines), while artifacts point to the imhunter-gatherer-fisher

agriculture. Numerous

Rissman (84) farmers and portance of riverine fishing. Reconnaissance of upland Neolithic sites in the Orissa hills suggests a very different Neolithic tradition. Here, sites such as Banabasa, appear to have been non-sedentary and largely non-ceramic, suggesting the likelihood of a pattern of shifting cultivation. An older excavation at the site of Kuchai, in the northern Orissa foothills, can probably be connected to this upland tradition, and showed a transition from microlithic technology to ceramics with ground stone axes.

As a working hypothesis, one can suggest two Neolithic traditions from the archaeology of Orissa, one associated with the coastal plain and major river valleys and another in the foothills and uplands, often in what are traditionally considered tribal areas. The Neolithic of coastal Orissa is represented by some impressive mound sites, with well-stratified and substantial sequences that begin sometime in the third millennium BC and continue into the Iron Age (early first Millennium BC), as at Golabai Sassan. These sites have produced extensive ceramic assemblages, animal bones and when excavated bone tool assemblages, including projectile and harpoon points. The harpoon points as well as environmental context of these sites (on perennial streams and rivers in the wet lowlands), suggests the likelihood that fishing was a significant part of the economy, in addition to animal husbandry and cultivation. Whether the full complement of sheep, goat, cattle and water buffalos were present from the beginning of this tradition requires clarification from systematic faunal sampling and reporting, although the apparent absence of sheep and goat from the surface bone assemblage of Golpalpur could hint at a more interesting process of gradual livestock adoption

Broadly contemporary with these sites is a quite distinct Neolithic that has come to light in inland, upland areas, such as Northern and Central Orissa. Neolithic sites in these areas are mostly known from surface collections, dominated by ground stone axe, and axe-manufacturing assemblages, and often little or no pottery. These sites appear to be largely superficial with little depth of deposit, nor clear archaeological strata and sparse find densities. Attempts to excavate some of these sites and sample for plant remains suggests that charcoal densities are low in the extreme or absent. What this pattern suggests is a very different nature of site occupation, of shorter longevity and/or longer lapses between occupation episodes. Either we are dealing with seasonally occupied sites, perhaps for special activities such as lithic/celt manufacture, or the loci of settlements of shifting cultivators, or both.

The Southern Deccan: The origins of agriculture in South India has been studied extensively but it is still obscure. General syntheses suggest that local plants were brought into domestication only after cultivation was established here based on introduced domesticates. Some authors, however, have

maintained that native taxa may have been domesticated before the introduction of crops from other regions. Two lines of indirect evidence have been offered. First, botanical evidence indicates that the wild progenitors of a number of small milletgrasses and tropical pulses occur on the Indian peninsula. Second, the Southern Neolithic culture (back to at least 2,800 B.C.), pre-dates the early villages in Maharashtra, which lies to the north, by at least three to four centuries. Thus there is an apparent spatial separation between the Southern Neolithic and the agricultural societies of the northwest. It is generally assumed that the intervening regions (including Maharashtra) would still have been inhabited by hunter-gatherers or perhaps herder-gatherers into the late 3rd millennium B.C., while South India was Neolithic, including at least domesticated fauna and probably cultivation.

The Southern Neolithic of northern Karnataka and southwest Andhra Pradesh, has long provided evidence for the earliest pastoralism in Peninsular India. A well-known site category of the Southern Neolithic is the ashmound, which has been shown to be an accumulation of animal dung at ancient penning sites that have been episodically burnt, sometimes to an ashy consistency, and sometimes to a scoriaceous state. Preserved hoofprints and animal bones indicate the dominance of cattle in the animal economy with a smaller presence of sheep and goat. Local savannah and woodland fauna were also hunted. Although Allchin and Allchin have made a case for local domestication of zebu varieties in the South, this suggestion is not yet corroborated by archaeological bone evidence. Their argument is based on the morphology of rock art depictions which contrast with contemporary Harappan depictions and suggests that varietal differentiation between southern and northwestern zebus was already established..

The crop package includes two small millets and 2 pulses. The consistently recovered pulses are two species native to the region, mungbean (*Vigna radiata*) and horsegram (*Macrotyloma uniflorum*) present from the earliest levels, while other pulses appear only in later levels. Other species are sporadic across the region or else present only in Phase III suggesting that these species were adopted by selected communities during the course of the Neolithic. These include non-native taxa, such as wheat and barley, possibly rice, hyacinth bean, African pearl millet (*Pennisetum glaucum*) and pigeonpea. Thus the staple taxa of the Southern Neolithic, on which the earliest agriculture in this region is likely to have been based are the imports, save two species of pulses which were native to this land. In view of these facts, it is difficult to understand the Fuller's statement that agriculture in the southern neolithic was a home-grown affair. Even the case of mungbean and horsebean is not that clear. It is true that the wild progenitor of mungbean is known to occur in the wet and dry deciduous forests on the eastern edge of the Western Ghats in clearings and forest edge habitats, but also occurs sporadically in parts of the eastern ghats. While recent hypotheses have suggested that the southern Neolithic mungbean was domesticated in the Western Ghats area, this area in fact provides both wild mung and urd and thus why only mung became a major crop of the Southern Neolithic seems curious.

Once established the millet-pulse-livestock agriculture of southern Deccan dispersed southwards and eastwards to adjacent regions. Evidence from the Kunderu river basin, just beyond the eastern distribution of the ashmounds indicates that the same subsistence package was established by sometime in the second millennium BC. The cultural differences, in terms of the lack of ashmounds and some distinctive aspects of ceramic style, might suggest that this represents cultural diffusion, as hunter-gatherer groups of the Erramalai hills and adjacent valleys adopted agriculture from their Ashmound Tradition neighbors. While the presence of hunter-gatherers in the recent colonial past in some areas could indicate the persistence of nonagricultural traditions. In some cases huntergatherers are specialist producers within a wider cultural network of exchange, as the example of pepper

procuring forager-traders of the late Medieval/early colonial period indicates.

The reported data from the Southern Neolithic show that its agriculture and animal husbandry was entirely based non-native taxa, two possible exceptions being the two pulses mentioned above. These include wheat and barley by *ca.* 1900 BC (but only on a minority of sites), hyacinth bean (probably a native of East Africa), African pearl millet (bajra) and pigeonpea and the vegetable Luffa (most likely from North India), all of the latter by *ca.* 1500 BC. There is still no clear sequence from foraging to farming, and indeed archaeobotanical evidence to assess the earliest Southern Neolithic agriculture is still lacking. It is after this point that settled agricultural villages become widespread on the peninsula, consistent with a model of demographic expansion of early peninsular farmers. For example, the millet-pulse-livestock agriculture of the Ashmound Tradition dispersed southwards and eastwards to adjacent regions. This diverse evidence from a large area indicates the spread of the Neolithic culture in South India beginning with 1500 BC.

Important contrasts in settlement location can be drawn between South India and other zones. Whereas the Ganges Neolithic, or the Neolithic/Chalcolithic of Rajasthan and Gujarat had settlement patterns largely focused on perennial waterways, especially rivers, the Southern Neolithic sites are consistently located away from major rivers. The granitic hills of the Southern Neolithic zone had springs, but the landscape context of sites suggests that monsoon rainfall rather than river level fluctuations would have been primary to millet and pulse cultivation in South India.

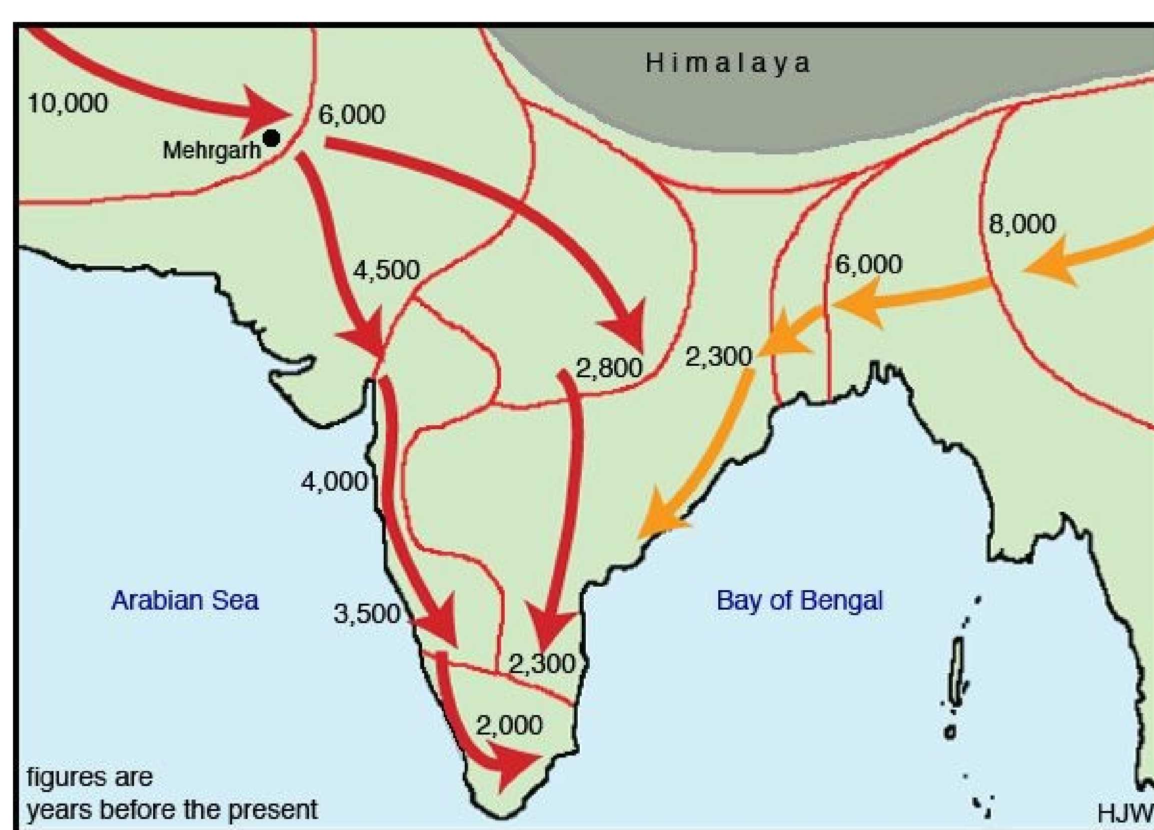
In summary, hard evidence for the early agriculture in South India, especially from welldated crop remains, is scarce for a region so large. Nevertheless, the available evidence suggests certain clear patterns. South India appears to have been host to a mosaic of processes, including local domestication of pulses, the dispersal of pastoral and agro-pastoral peoples between regions, and the adoption of food production by indigenous hunter-gatherers from neighboring cultures. There is no sign of indigenous domestication of any plant or animal on which the Neolithic economy could have been based. The evidence presented above suggests that native species were domesticated after the arrival of introduced species. It is therefore not possible to characterize peninsular India a region of independent agricultural origins, even late by comparison to other world regions. This archaeobotanical picture must be considered alongside the faunal evidence for the introduction of sheep and goats and perhaps cattle.

From the Indus Valley to inner India: Evidence for the Spread of Seed Agriculture: As the above archaeological data shows, the spread of the Indus crops into India was delayed by at least three millennia, if not longer. This constraint has generally been explained on the basis of climatic conditions, in particular the predominance of summer rainfall. As the theory goes, within such monsoon zones we might expect summer crops to dominate, as was the case in Gujarat and South India. This hypothesis, however, does not explain all. The perennial rivers of the Ganges Valley and others did offer the means to grow winter crops as well as monsoon crops, as the rivers and water steams in the Greater Indus Valley did. Indeed Mature Harappan archaeobotanical evidence from this region consistently shows the presence of native Indian monsoon crops alongside the Indus crops when agriculture did begin in that region.

The available evidence from peninsular India suggests that winter and summer crops were both part of the agricultural system at the earliest Neolithic sites. These crops included native Indian pulses such as horsegram (*Macrotyloma uniflorum*), which might be from domestication in Rajasthan,

Gujarat or the Peninsula, and the mungbean (*Vigna radiata*) which could have a western Himilayan origin as well as one on the peninsula. At most sites, these “Indian” crops were indeed a part of agricultural package where wheat, barley, goats, sheep, and cattle were an integral part. This implies that monsoons probably did not have anything to do with the dispersal or non-dispersal of agriculture from the Indus Valley to the neighboring areas of India. The main reason appears to be the geographical constraints, namely the intervening of the Thar that separates the Greater Indus Valley from peninsular nIdi, as well as the jungle and marshes that separated the Indus Valley from the Gangetic plains. The implications of this formidable barrier between the two countries has been amply discussed in Chapter I.2.

Once the physical barrier was breached in the late third millennium BC by the migrating Indus people at the end of the Indus Civilization, the Indus crops quickly spread further east into the Ganges valley and south into Peninsular India through Kutch and Gujarat. Direct AMS dates document these in the Ganges valley in the early third millennium BC, such as barley at Damdama by 2400–2200 BC and at Senuwar and Lahuradewa before 2000 BC. These crops had reached the southern Neolithic zone by 1900 BC. Fuller argues that in both South India and the Ganges valley, the early finds of the Indus package of winter crops suggest that these species were added to existing agricultural systems based on other, monsoonal crops, and did not get agriculture started. This may be so but is it just a coincidence that the cultivation of Indian crops, such as pulses and millets started at precisely the same time horizon when the western crops were being introduced there?



Seed agriculture, especially barley, wheat, and some pluses, along with domesticated goats, sheep and cattle, diffused in India from the Indus Valley after the fourth or even the in the second millennium BC, while the cultivation of rice most likely arrived from the East almost during the same time period Yellow arrows). However, India as a whole was an agricultural land after the onset of the Iron Age, around the first millennium BC., long after the Indus Valley had already seen its zenith in the form of the Indus Civilization.

A useful framework for thinking about these alternative processes of secondary origins is frontier theory. Within this frame-work we can attempt to distinguish two alternative processes as dominating the establishment of agriculture in any region without local domestication of all its food species. On the one hand we have moving frontiers when the prominent process is the movement and colonization by agricultural populations although with at least some recruitment from pre-existing huntergatherer populations. This may have been driven in part by the higher population densities and population growth in agricultural societies (also called demic diffusion) and could have been allowed by their ability to exploit environments to which agriculture was to be adapted. This process need not mean a spread of wholesale archaeological cultures, however, for as research in the Eastern Mediterranean indicates, the cultural elements that accompany colonization may be selective.

The alternative process may be termed a static frontier, in which stable agriculturalists interacted with hunter-gatherers and other neighboring farmers. Such static frontiers would incorporate the “interactive trade” between hunter-gatherers and settled agriculturalists, a process which has been inferred for Gujarat and adjacent Rajasthan on one hand and with coastal Sindh on the other. During this process some hunter-gatherers may have gradually taken up aspects of the Neolithic (i.e. cultural diffusion) and also new agricultural developments may have allowed the exploitation of new environments. Social interactions were doubtless also important such as inter-marriage, and new cultural traditions could have developed. We have already discussed this mechanism elsewhere, further details could be gathered from Fuller’s original paper (71).

Evidence for the expansion of farmers and herders from the Indus Valley into Gujarat and the Divide appears at a number of sites. The early occupation at the Gujarat sites seems to date to the Amri-Nal Phase, with Padri and Loteshwar suggesting an even earlier movement there, possibly during Kechi Beg times. Period I at Dholavira has ceramics that have typological similarities with Amir Period II. The occupation at the northern sites, namely those of the Indo-Gangetic Divide, appears to date the late Kot Diji Phase, not earlier.

An indigenous ceramic complex is sometimes mentioned in Gujarat in the fourth millennium, possibly a bit earlier (5). Its material culture can be found in North Gujarat, eastern and southern Saurashtra, and possibly other parts of Gujarat as well. On close observation, however, some other archaeologists indicate that these appear to be typical Early Harappan sites, at least in so far as the ceramics are concerned.These Early Harappan remains at various sites seem to represent the continuation of the cultural processes that linked Gujarat with Sindh and Baluchistan in prehistoric times. The routes involved movement into and across the Ranns, as documented at Surkotada and Dholavira (5).

The situation in the Divide is similar but a lot more simpler. Here, there is no sign of any permanent settlement of agricultural peoples before the appearance of Kot Diji pottery at Kalibangan, Bernoulli, and other indigenous sites. This means that the general cultural landscape of this area before the advent of Kot Diji agricultural based culture was that of hunter-gathers and nomadic pastoralists. The Indus peoples of Punjab, therefore, moved into a ‘cultural vacuum‘ and started a food producing revolution. This intrusion of westerly agriculturists was, however limited in geographic depth, confining to the Divide only. A real push seems to come at the decline of the Harappan Civilization when a number of agricultural villages in Punjab were abandoned and the population of the Ghaggar-Hakra region started to move eastward. This is the real beginning of agricultural economy in northern India.

Culture Diffusion and the migration of people spreading their technology is one of the oldest topics in archaeology and prehistory. The subject has already been touched upon several times in this book and the possible spread of farming and herding peoples out of the old Neolithic core area of Baluchistan and the adjacent plains of the Indus Valley into the western drainage of the GhaggarHakra river has been noted. In the course of that discussion, the movement of pastoral peoples was invoked as the mechanism that led them there, which is the basis of Possehl's modeling of culture change during the various stages of the Indus culture. This model is different from that generally ascribed to for explaining the spread of agriculture from the Near East to Europe and possibly to Central and South Asia. Here, some seed bearing peoples, the Near Eastern farmers themselves, move from place to place and sow the seeds of civilization.

The hypothesis of Possehl is that pastoral peoples were usually the lead element in exploring new territory in the Greater Indus Region and the adjoining areas in neighboring Punjab and Haryana in India on one hand and in Gujarat on the other. Some of the reasoning here has to do with ecology and the mobility of these people and their need for new pasture, plus the economic rewards and prestige that come with the discovery of new raw materials. The expansion in the two nodes, one in the northeast and one in the southeast, was possible for geographic reasons while the expansion efforts into the vast Thar Desert and across to central India would have been futile.

As is evident from the above general discussion, two areas of India are of our primary interest: the Northeastern and Southeastern borderlands of Pakistan. In both of these areas the archaeological data are confusing at best and deliberate misinterpretations at worst. There is particularly little chronological reference to the spread of seed agriculture, the development of pastoralism, and the formation of settled agricultural villages. Nevertheless, whatever their worth, they all indicate a steady spread of the Neolithic culture eastward. This leads us the spread of agriculture in peninsular India. Although not directly associated with Pakistan, this area does have an indirect connection with the spread of Indus agriculture to the neighboring areas.

Northeastern Borderlands: By the Northeastern Borderlands we mean the small interaction zone along the Indian Punjab and Haryana, excluding the area between the Sutlej and Bias. This is a narrow strip of land below the foothills of the Siwalik hills, later joining southward to an equally small area along the riverbed of the now dried up GagharHakra River braids. Most of the archaeological sites of our interest lie in these two interconnected areas to the west of the Indo-Gangetic Divide, although some of the Indian archaeologists and their students frequently strain to stretch this interaction zone up to the vicinity of Delhi. Quite a few archaeological sites have been discovered in the this interaction zone which have significant relevance to the spread of Indus Civilization toward the east. The pre-Harappan Neolithic sites, with which we are primarily concerned here, are few and the published data are quite confusing, often untrustworthy.

It appears that two types of settlements developed in this borderland area. The first is the pastoral campsites similar to those found at Bagor to be discussed later. The second type is rudimentary fixed settlements of the Neolithic type with some pottery and agriculture but mainly pastoral in character. These settlements belong to a cultural period that has been named Sothi-Siswal Phase, after the two sites of this culture. These are different from the commonly accepted definition of the Early Indus or Early Harappan in the Greater Indus Valley. The pottery differs quite a bit and the economic base is not entirely agriculture. Most importantly, the culture developments have no relation to the development of Harappan urbanism. We should therefore refer to these sites as 'pre-Harappan' rather

than the Early Harappan.

There is not a coherent set of data and, whatever is available, is of very little help in dating the Sothi-Siswal Phase. It is curious that in spite of the fact that there are a number of other excavated Sothi-Siswal sites (Sothi, Siswal, Nohar, Mitathal, Bannawali) there are no radiocarbon dates available from them to date. Thus, the chronological setting of Sothi-Sisal is not certain: it may be of later origins than generally believed. In fact, some Indian authors (e.g. Dishkit and Gupta) conclude the Sothi to be contemporary of the Mature Harappan in the Indus Valley. According to Possehl, it takes an ‘act of faith’ to suggest that the Sothi-Siswal Phase conforms to the chronology of the Early Harappan Stage generally.

It is generally assumed that Sothi-Siswal area was one with mixed farming and herding. This is, however, not certain. Most of the sites are very small and their transitory nature assures us that they were mainly the locales of temporary encampments. Perhaps the most interesting observation concerning the subsistence regime here was made by Walter Fairservis when he noted that with the Early Harappan expansion into this area, they reached the limits of practical wheat/barley cultivation.

Whatever the chronological setting of these Sothu-Sisal sites, they appear to be a weak reflection of the Indus culture rather than an independent culture at par with the Early Harappan. There are strong indications of the Indus influence in Sothi and Siswal sites themselves. According to the excavators Kot Diji pottery is conspicuously absent at Bernoulli and other Sothi-Sisal sites but according to M.R.Mughal, who had the opportunity to examine the Kalibangan artifacts in New Delhi in 1986, one can easily trace the origins of the pottery at Kalibangan to Kot Diji style. In some ways, the settlement of Kalibangan resemble quite a bit with the generally contemporary culture prevailing in the Punjab in Pakistan. This typological system developed by Mughal is quite different from that developed by B.K. Trapper and other Indian archaeologists, and it is not easy to reconcile the two systems.

In a nutshell, we do not observe any discernible indigenous settled agricultural based communities in this area until late in time, probably after 2500 BC and most likely around 2000 BC. These agricultural villages proliferate in this general area as the Indus Civilization was wilting and a general movement of farmers had already begun from the west.

Southeastern Borderlands: By Southeastern Borderlands is meant here the Kutch and the area lying on the coast of Gujarat and its northwestern region, close to the borders with Sindh. Gujarat is separated from Sindh by the *runns,* stretches of salt deserts and marshes. Nevertheless, the two regions are affectively connected through several pastoral routes, which the animal herding nomads used to migrate between the two regions for millennia; in fact they still do. Tharparkar is one of such route. Thus, the communication between the Indus Valley and Gujarat, although difficult, was possible. Unlike the western front of Pakistan, however, Gujarat did not interact with the Indus Valley in the accepted sense of the word: it was primarily a case of expansion of the Indus culture into the border-lying areas of Gujarat. This expansion probably happened through the aforementioned pastoral routes while the coastal contacts through boats could have played a role in later times also. As the expansion took place, the sway of the Indus culture in Gujarat was complete. Because of this overwhelming influence, some prehistorians have called this process a “cultural imperialism”.

It appears that the Indus people began to make inroads into Gujarat as early as the Tagau phase, but definitely during the Amri phase. The most effective intrusion of the Indus culture in Gujarat was, however, in the Late and post-Harappan times. That is why this area is rich in Late Harappan sites. The

Early Harappan sites seem to be contemporary to the similar cultures in Sindh but the Mature Harappan sites seem to be of later times than that in Sindh. Interestingly, some of these sites continued flourishing even after the demise of the Indus Civilization in Pakistan. Their cultural content seemed to be changing, in fact downgrading, but they survived for considerable length of time.

Although the names of several sites have been mentioned in profusion in the writings of Indian lay historians and political commentators during the past three or four decades, the available hard-core information is not sufficient to treat this borderland area in any detail and with any degree of certainty. Some ultra-nationalist archaeologists have played a damaging role in confusing the subject matter which could have been quite relevant to the Late Neolithic and the Early Harappan period of Pakistan and the border-lying regions. Nevertheless, some new and important insights into people's life of the neighboring Gujarat during the Early Harappan Stage is indeed available and a review of a few sites is given elsewhere in this book.

The Harappan culture came here to depend less on winter-grown wheat and barley but on summer-grown cereals and legumes. Although some sites show that the people here retained an economy based on western Asian crops until after 1000 BC, the partial shift to millets and sorghum undoubtedly advanced the process of the agricultural colonization of the entire area of Gujarat and further south in Deccan. Two of the plants involved in this process, finger millet *(Eleusine coracana)* and sorghum *(Sorghum bicolor),* are believed by some archaeologists to have originated in Africa, although some botanists dispute this in the case of finger millet. As stated earlier, the two cereals could have been spread by trade contacts - extensions, perhaps, of the historically documented trade between the Indus Civilization and the inhabitants of the Persian Gulf area during the late third millennium BC. Two other millets, *Panicum miliaceul* (common millet, perhaps domesticated in northern India) and *Setaria italica* (foxtail millet, which may have been first domesticated in eastern Europe or central China), also played a part in this spread of agriculture. Millets never became as important on the Ganges plains as in the Southwest of India.

Like that in the Northeastern Borderland, the Indo-Gangetic region, the evidence for settled agricultural communities in Gujarat is missing till the Early Harappan period (ca. 3000 BC). There is, however, some evidence for pastoral camps, especially in northern Gujarat. It is assumed that the area was sparsely populated and the inhabitants were hunter-gatherers and occasionally pastoralists. The seed agriculture and settled communities came here rather late, although somewhat earlier than the Northeastern Borderlands, described earlier.

From the Indus Valley to Inner India: The cultural materials associated with the oldest farming settlements in India are extremely varied - there is certainly no single cultural source. The spread of agriculture from the Indus Valley towards Maharashtra and the Deccan was associated from the start with a number of artifacts and activities that may reflect Harappan antecedents. For example, these people produced painted wheel-made pottery fired in true firing chamber kilns, and copper and bronze axes. They carried on a stone blade industry and made clay figurines of humans and animals, particularly cattle. Their economy was based on various combinations of summer and winter cereals, along with domesticated cattle and, to a lesser extent, sheep, goats, pigs, buffaloes, and fowl. Houses were rectangular, with walls of wattle and daub or stones set in clay, lime-plastered floors, clay ovens, storage pits, and storage platforms. A few circular structures have also been found, probably used for storage.

Examples of such sites, dating from about 2600 BC onwards, are found at Ahar, in Rajasthan; Kayatha and Navdatoli, in the Malwa region of Madhya Pradesh; and Inamgaon and Daimabad, in Maharashtra. At Inamgaon (about 1400 BC), an area of 5 hectares (12 acres) was partly fortified by means of a bank of earth and stones, with the houses laid out on a roughly rectangular grid and separated by lanes. One area of the site was fed by an irrigation ditch, which suggests that crops (mainly barley and legumes in this instance) were probably cultivated all year round.

Furthertothesouth,inKarnatakaand Andhra, the oldest agricultural sites, dating from the late third millennium BC, contain circular houses, some of which have stone foundations and mud- plastered floors. While copper tools were used from the time of the earliest agricultural expansion, stone axes and blade tools were still being produeed. At sites such as Hallur and Tekkalakota, in Karnataka, and Ramapuram, in Andhra Pradesh, the economy was firmly based on eattle husbandry and the cultivation of millets (including pearl millet, *Pennisetum typhoides*, which may also have originated in Africa). Surprisingly, little is known of early agricultural developments in the far south of India. In Sri Lanka, the first cultivators do not appear to have arrived until the Iron Age, between 1000 BC and 500 BC. The earliest evidence from the Peninsula remains that of the ashmounds of Karnataka from *ca.* 2500 BC to 1500 BC with a noticeable gap in contemporary or earlier evidence in the intervening region of Maharashtra.

In the Ganges valley, current evidence indicates the absence of domestic fauna at sampled Mesolithic sites, but confirms cattle but not sheep or goat at Neolithic Mahagara and Koldihwa. Unfortunately, it is unclear whether any of these faunal remains date to earlier than the mid-third millennium BC to which the bulk of the deposits from these sites probably date. Further east at Chirand in Bihar sheep, goat and cattle were herded by early agriculturalists by the start of the second millennium BC. Further work is needed to more clearly outline the dispersal of the different livestock in the Gangetic region and the extent to which their dispersals differed from each other and from that of crop plants. At present, the evidence for the beginning of sheep and goat herding is indicated in the third millennium BC in the west and the early second millennium BC in the East, the middle Ganga plains falling in between.

The importance of rice suggests that early agriculturalists with a cultural tradition derived from the Indus Valley were not the only settlers in this region. At many sites in Uttar Pradesh and Bihar, there are signs of earlier occupation by settlers who grew rice, made the cord-marked and rice-husk-tempered pottery typical of Southeast Asia, and built circular huts of wattle and daub. They had already colonized the plains before 2000 BC, and their traces, usually also associated with western-type crops and domestic animals, can be seen at Koldihwa, Mahagara, Sohagaura, and Chirand.

Late Mesolithic Sites around Bagor, Rajathan: The archaeological site of Bagor is a Late Mesolithic (pre-Harappa) archaeological site located on the Kothari river in the Bhilwara District of the Rajasthan region of western India. It is frequently mentioned in archaeological literature in connection with Mesolithic of India and sometimes also in connection with the domresticatio of goats, sheep and cattle. Bagor was excavated by Deccan College scholars such as Virendra Nath Misra and Vasant Shinde in the 1960s and 1970s, who found evidence for the domestication of sheep, cattle and goats by the nomadic pastoralists of Bagor dating as early as 3000 BC (85). Indeed, in this region a case can be made for the spread of livestock amongst hunter-gatherers, although the association with the first ceramics requires clarification. It remains, however, to be clarified as to whether sheep and goat have been adequately distinguished from wild blackbuck. Elsewhere hunter-gatherer

communities persisted until the end of the third millennium. For example, further south in Rajashtan, the site of Langhnaj has a well-documented assemblage of wild hunted fauna form the mid to late Third millennium associated with ceramics of the Ahar Tradition.

Summary and Conclusions: The prehistoric tapestry of food production and consumption in India includes the merging of practices from different regions. The wide dispersal of the Southwest Asian winter crops, especially wheats and barley, can be seen as a Harappan legacy adopted within extraHarappan and post-Harappan communities of India through its northwestern and southwestern regions bordering Punjab and Sindh, respectively.

While this process has been constrained and facilitated by environmental conditions, we have argued that the development and spread of agriculture in India cannot be reduced to responses to environmental difference alone. Environment alone seems insufficient to explain the archaeological patterns, and account must be taken of geographical factors.

With respect to the beginning of agriculture and animal domestication in the subcontinent, archaeologists have long argued that barley, wheat, chickpea, and domesticated goats, sheep, and cattle were first introduced to the Greater Indus Valley from the West and from here they dispersed to the east across India. They also argued that the dispersal of plant and animal domesticates was at times accompanied by the human colonizers themselves (44,86). Later researchers challenged such conventional thinking, arguing for a much more complex situation involving the development and exchange of domesticates by extra-regional and regional populations. Fuller contends that rice, water buffalo and chickens may have been separately domesticated in South Asia and East Asia, and suggests that additional varieties of these domesticates may have been introduced to these regions at a later date. In addition to agricultural imports from other regions, Fuller makes a persuasive argument for the domestication of certain animals (e.g., zebu, sheep) and varieties of plants (e.g., cotton, millets, pulses) in various geographic areas of the subcontinent, including the Indus basin, the middle Ganges, Gujarat, Orissa and south India. Based on genetic analysis of *Bos indicus*, Magee, Mannen and Bradley indicate the complexity of domestication, pointing out that cattle may have been domesticated in more than one place in the subcontinent.

It is only fair to note that the spread of agriculture from Pakistan to India was rather slow and hesitant. Firm evidence for the establishment of Neolithic communities in peninsular India comes from the middle second millennium BC at the earliest although some evidence for earlier dates is forthcoming from Kutch and Gujarat as well as from the Indo-Gangetic Divide. Here we notice the establishment of agricultural communities as early as the third millennium BC. The reason for such a slow diffusion of agriculture in India is primarily the geographic impediments between Pakistan and India beyond the two norrow interaction nodes - one in the south-east connecting southern Sindh to Gujarat, and one in the northeast, connecting northreastern Punjab with the Divide. It is also to be noted that the areas wherein agriculture was being introduced were not empty; they were inhabited by mobile groups of hunter-gatherers or populated by small communities of mesolithic culture, some of them practicing animal husbandry along with general foraging.

Evidence presented in this chapter suggests that the Near Eastern winter crops, those that formed the subsistence basis of the Indus Age, diffused into peninsular India where they were combined with native pulse and millet domesticates. As a working hypothesis it is suggested that native pulses, including mungbean and horse gram, were domesticated in the wet to dry deciduous forests of the

South Deccan, where small millet-grasses were also utilized, probably as cultivars. Root foods were perhaps also utilized but were eventually eclipsed by seed crops. This staple package was adopted by the early village societies of the southern as well as northern peninsula where they were combined with the winter/Harappan crop package.

From the point of view of the Southern Neolithic it was only barley and wheats that had social attractions and were adopted into cultivation. The adoption of these crops corresponds generally to a period of increasing culinary elaboration as inferred from ceramics, and to an era of increasing longdistance trade and exchange of cultural influences with the chiefdoms of the northern peninsula. To better understand these processes in South Asia, we need more evidence for past subsistence, such as from archaeobotany. We need to critically assess that data in terms of its formation processes and consider it then in relation to other lines of archaeological and paleoenvironmental evidence.

We should be mindful that, unlike the ongoing relationship of the Indus Valley region to that in the West, the contacts between the Indus Valley and the penninsular India were very limited in prehistory till the onset of the Iron Age. It is for this reason that all evidence points to the introduction of major Indus crops to the Ganga-Yamuna Valley and the penninsular India as late as second millennium B.C. Liversage (87) argued that farming and pastoralism only developed in India after the Neolithic farmers of the Indus Valley were able to 'breach the barrier' formed by the Thar desert, allowing the development of rice farming in the Ganga valley and cattle pastoralism in the Deccan, along with the adoption of the SouthWest Asian package of crops. This breach of barriers was largely confined to a corridor along the Siwaliks, connecting the northern Indus Valley to the Ganga-Yamuna plains through the Indo-Gangetic Divide. A similar corridor was available in the south, generally skirting the coastline, which connected Sindh with Kutch and Gujarat. This is why that seed agriculture in India first began around these two nodes. The dates of this introduction can be debated endlessly and the South Indian Neolithic can be brought into discussion to confuse the issue but the fact still remains that agriculture in India in its totality was an introduction from the West and rather late - within a temporal horizon of 1500-2500 BC.

The spread of agriculture from the Indus Valley during the third millennium BC at the earliest and the mid second millennium BC at the latest was relatively a simple process. The western crop and livestock package dispersed into adjoining parts of India largely through the two narrow corridors of communication, mentioned above and discussed in details in Section I. Sporadically, pastoral practices also seeped through the Thar Desert, introducing the goat and sheep to Rajasthan and Gujarat.

Adomesticfaunaeconomyiswellestablished in Saurashtra by *ca.* 3000 BC with the Padri culture, and it is likely that this culture also included cultivation, although this is not yet confirmed through flotation for plant remains. The beginnings of the Ahar culture of Rajasthan can now be pushed back into the fourth millennium BC, which included cattle and sheep/goat pastoralism but no crop cultivation.

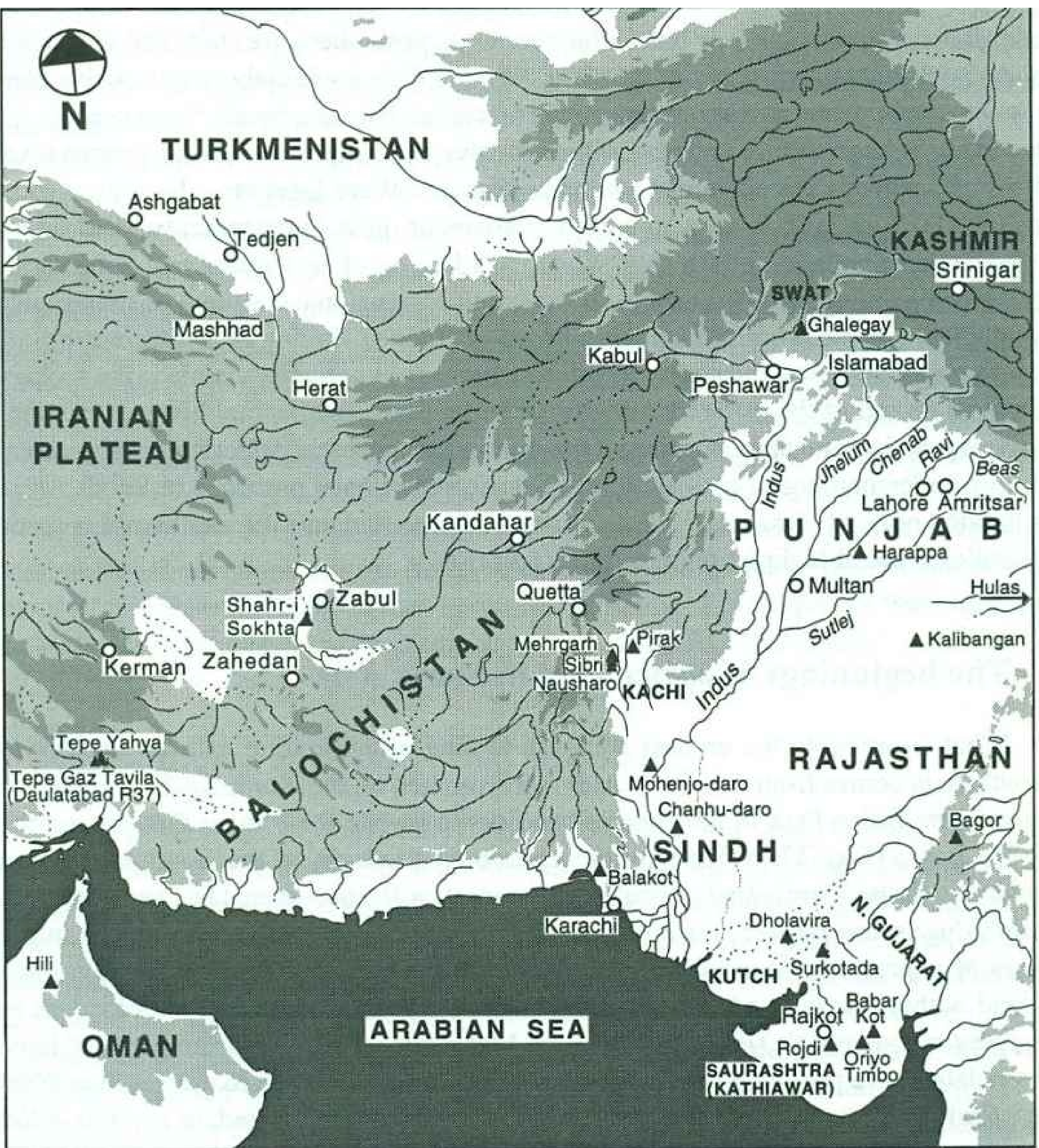
Despite some claims for additional Zebu domestications, and some suggestive proxy genetic indicators, there is as yet no clear archaeozoological evidence to locate the second domestication of cattle in India. Nevertheless the presence of large *Bos* bones, which suggest the existence of wild cattle populations into the Neolithic/Chalcolithic period in both Gujarat and South India as well as possibly the Vindhyas makes additional zebu domestication(s) plausible but not likely. In some regions, such as the middle Ganges, cultivation is likely to have begun prior to animal domestication. In other regions,

such as Rajasthan and Gujarat, however, livestock may have spread without crop plants.

The spread of plough agriculture in peninsular India remains problematic, although it is sometimes suggested to be coincidental with the adoption of agriculture in the second millennium B.C. In many parts of the Deccan, ploughing seems to have been adopted only in recent centuries (88). Of interest in this regard is historical linguistic analysis for widespread cognate terms for plough in Indo-Aryan, Dravidian and Munda languages which may derive from early borrowing between these groups or from a common substrate, most likely from the Indus Valley (89).

Finally, the hugely improved database of welldated sites with well-studied subsistence data makes it quite clear that the beginnings of millet/ cattle farming systems in central and southern India were characterized not by the steady 'wave of advance' predicted by colonist migration models but rather by 'punctuated explosive dispersal'. Barker has argued (25) that the dominant process was the acquisition of domesticates by indigenous foragers, at different rates and in different ways, and in the initial phases of use perhaps more for their value as status items than as food staples.

IV.4. The Spread of Agriculture and Pastoralism in Pakistan



At last we come to the discussion of our main subject, that is, the spread of agriculture and pastoralism in Pakistan. The foregoing chapters on such developments in the borderlands, especially those in the West, were necessary because environmentally Pakistan was similar in ecology to this vast geographical area and because Pakistan had a number of cultural features that were common throughout this expanded interaction zone during its Neolithic transformation, in fact throughout the Indus Age. All of this region subscribed to a subsistence regime wherein barley, wheat, pulses, goats, sheep, and cattle played a preeminent role. The interaction with the East, that is, India, became

important in subsistence strategy rather late but important nonetheless. We would like to discuss the beginning and spread of agriculture in the Greater Indus Valley in regional context, this may at time s make some repetition inevitable.

The focus of our attention in this chapter is the beginning and spread of agriculture in Pakistan but it also touches upon the cultural and technological transformation that was occurring in parts of Baluchistan some 9,000-10,000 years ago, the fundamental changes that we collectively call the Neolithic. In this respect, this chapter has a lot in common with Section III, as well as Section II. We do not know precisely how agriculture and pastoralism began in this part of the world but we do have plenty of material as to be able to outline its spread. We also do not know how long it took for specifIc crops and animals to become subsistence staples in various parts of this land. The process may have been short in some cases, long in others, but when viewed at the scale of the whole South-West, Central and South Asia within a perspective of the past 10,000 years, the results of this can be seen to have been nothing less than revolutionary.

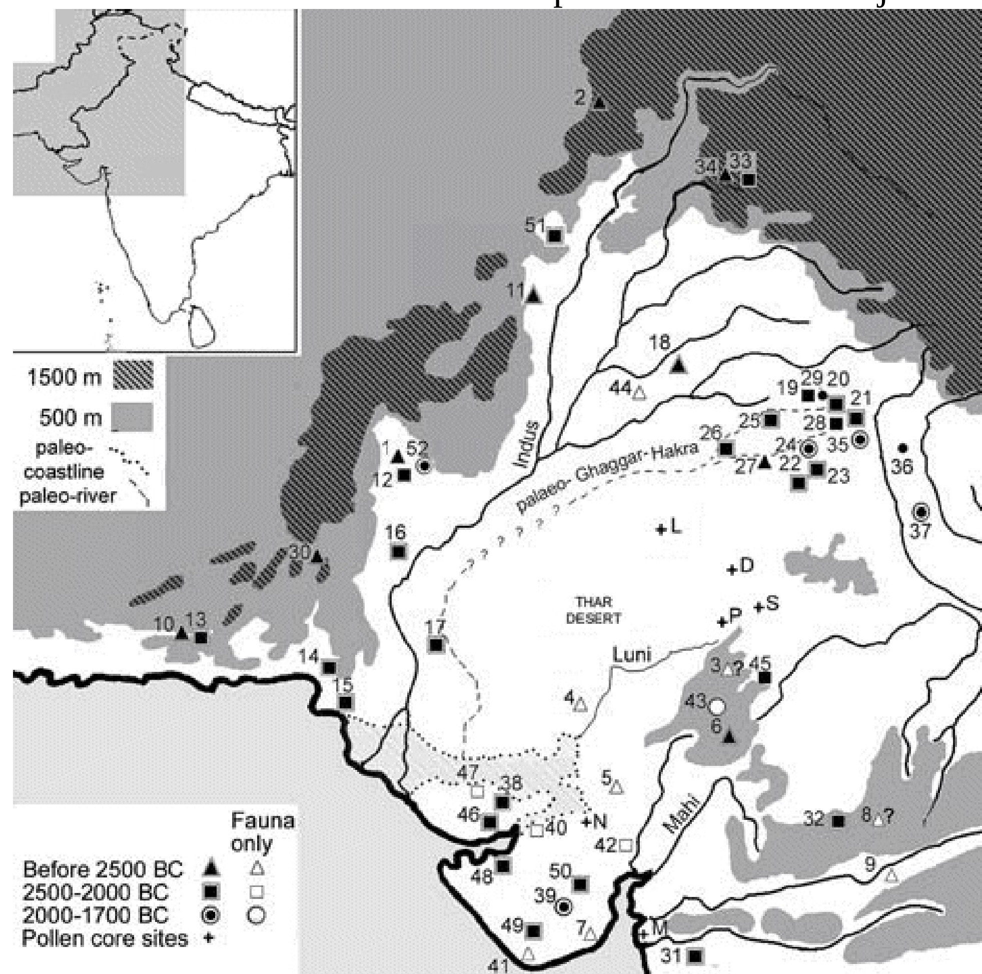
While a lot of research efforts have gone into the question of domestication of plants and animals in the Old World, very little has been said about the development and spread of the art of agriculture and pastoralism. Thus, while we are fortunate to have the Near East that provides us with a detailed backdrop for a full understanding of the process of domestication, we are either blank or mired in controversies in matters of such issues as to how the agricultural revolution spread throughout the Old World in a relatively short time and how the various domesticated plants and animals dispersed to the areas where urban civilization subsequently arose. These are the topics that have become of tremendous interest to prehistorians and archaeologists alike in recent years. With this discussion, the issue of independent development versus the adoption or diffusion of technology and culture also comes in focus.

The development of agriculture, pastoralism, and a settled way of life is not the sole prerogative of archaeology to explain: it involves a whole range of issues, which relate to anthropology, climatology, biology and, above all, geography. Other issues are cultural and societal. These are complex sets of issues and need to be tackled over a broad geographic area instead of focussing our attention on a specific and narrowly defined region alone. In this chapter we review once again the conventional wisdom about the origins of agriculture in general and its spread to Pakistan. We shall critically examine the various postulates, such as the possible migrations of some seed-bearing farmers to Pakistan from the West, and see if we can consider an alternative scenario for domestication of plants and animals and the spread of seed agriculture and pastoralism in this part of the world. We shall pay special attention to the staple crops and see how they developed and got established over the length and breadth of this land. Our focus will be the spread of agriculture rather than the question of domestication but we cannot ignore this context in its totality, even at the expense of some repetition.

In 1976 Sir Joseph Hutchinson summarized what was then known about the character of early South Asian plant and animal husbandry. The framework he created for his paper, titled *"India: local and introduced crops*" (3) still stands, although the question of origins is somewhat less "obscure" now than it was three or four decades ago. We now know that the development and spread of agriculture and pastoralism in South Asia are complex phenomena that have taken place over the course of more than 9,000 years. Within this period at least

three major transformations occurred that can beJ World Prehist (2006) 20:1–86

related to the introduction and adoption of suites of major new crops and animals to the subcontinent.



Sites in Pakistan and the adjoining parts of India with early evidence for agriculture.

Fig. 10 Sites in Northwestern South Asia with early evidence for domesticates. Sites are divided into three broad temporal horizons, prior to the emergence of Harappan Civilization, more or less contemporary with Mature Harappan Civilization, and the Late Harappan phase. Note that sites on the northern peninsula dating

The fIrst of these involved Southwest Asian forms, the second African and Asian species, and the third, at a much later stage, plants from the Americas. In addition to the imports, local forms of plants and animals came to be husbanded or continued to be gathered from the wild. Indeed, an important feature of ancient Pakistan is that it is one of those parts of the world where foragers and farmers lived side-byside in many localities until quite recently. The focus of attention in this chapter is the Greater Indus Valley and the first two agricultural transformations, namely, those that took place between about 7500 and 5500 BC and between about 2500 and 1500 BC. The period of the third transformation, from about 1500 BC onwards, is not discussed.

Before reviewing the state of research and providing an overview of the evidence, it is important to follow Hutchinson's lead and emphasize that human subsistence activities are constrained by such environmental factors as timing, availability and amount of moisture, atmospheric temperature, population density, distribution and duration of vegetative growth, as well as the kinds of plants and

animals that can be raised. For the Indus plains, the timings of floods and monsoon rains and the locations affected are of particular importance. In much of the region, the months of June through September are the wettest, with river flooding being a direct result of rainfall upstream, although the large rivers of the north also carry snowmelt from the Himalayas. Another important factor is temperature, particularly the presence of colder weather during the winter months throughout the alluvium and the highland surrounding the Indus plains. This has permitted the growth of such characteristically West Asian crops as wheat, barley, peas, lentils and flax during the cooler *rabi* period of November/December through April/May. In contrast, the Asian or African crops such as rice, and the millets that require warmth, are *kharif* crops grown in the period from May/June through October/November. The combination of warm temperatures and plentiful supplies of water is particularly important for rice cultivation, and areas with less available moisture can support the growing of millets in the same summer season. Of course, actual timings for planting and harvesting vary, depending upon the specific crop and upon local conditions that can differ signifIcantly even within a single district. Except for the cultivation of cotton and sugarcane, overall, the *rabi* crops are much more important in Pakistan than the *khjarif* crops. In this respect, this region resembles more with the West than with the East.

In spite of the possibility of interesting studies on a range of questions concerning past agricultural and pastoral practices, and on relations between those and hunting and gathering, only limited bioarchaeological research has been carried out in Pakistan, and what has been done is of uneven quality. In spite of these disquieting realities, we continue to develop a picture of agricultural and pastoral adaptations in the Greater Indus Valley, specially in Baluchistan, through the course of the Holocene. It is hardly more than a sketch, and an enormous quantity of high-quality work over an immense area has gone into completing the outlines and fill in the details. In this connection, the work of Richard Meadow (13,14) and that of Lorenzi Costantini (15,16,17,90) are particularly valuable. The analytical work of Possehl, as outlined in his *Indus Age - The Beginning* (5) is equally important. In all these efforts, the cultural material is not only varied in time but also extensive, covering the northern, central and southern parts of the Indus valley. From the north, the excavated material comes from Swat, Dir and Sarai Kala near Taxila; from the central area the excavations at Jalilpur and Gumla have supplied the data; from Baluchistan Kili Gul Muhammad provided the first reliable date; and later on Mehrgarh, at the foot of the Bolan pass, has proved to be a classic site showing a full sequence of the beginning of agriculture and sedentary living in this region. The Kachi plain, where it is located, is a transitional area between two different worlds, the arid inland plateaux of Baluchistan, Afghanistan and Iran on one side and the Indus plains on the other.

The development of agriculture and pastoralism involved the domestication of plants and animals. Domestication required a change in human attitudes and practices from those orientated towards gathering or hunting for immediate (or even deferred) consumption to those actively directed towards ensuring the reproduction of subsequent generations. The effect of the domestication process was to create behavioral, morphological and eventually genetic changes in the targeted plants and animals of a kind that made those forms greatly (if not always irreversibly) dependent upon humans for nourishment and especially for reproduction.

On the cultural side, structural changes in the nature of socio-economic relationships within and between human populations were facilitated by the ability of individuals or small groups to obtain and then maintain control over alienable subsistence resources that were very restricted in number and over the means for their production and reproduction. Thus, foundations for the development of

increasing social differentiation and hierarchy were set.

The Conventional Wisdom: The conventional outline of the beginning and spread of agricultural in Pakistan is that agriculture and animal husbandry began in the Kachi plain of Baluchistan, on the borders of Sindh, around 9,000 years ago, as evidenced by the settlement at Mehrgarh (91). These agricultural settlements then spread over a large area of north-eastern Baluchistan and southwestern Sindh, growing in size and technological sophistication. Soon the entire Indus Valley was dominated by farming villages and well-developed pastoralist communities. The surpluses produced from intensive agriculture and wide-spread pastoral activities encouraged craft production, complex social organization, career specialization, and the development of trade and exchange networks. This led to the appearance of cities and towns around 5,000 years ago (5,92). The beginnings of agriculture and pastoralism, however, did not mean the end of the hunting-gathering. Communities that practiced animal rearing and seed agriculture usually continued to hunt and forage for food.
ter; suffice to say here that the spread of domesticated plants and animals from the Near East to mainland Iran, Central Asia, and the Greater Indus Valley is not wholly without merit. A lot of research has gone into this paradigm and all of it did not stem from the 'Euro-centric bent of mind' of the researchers. Furthermore, there is no alternative

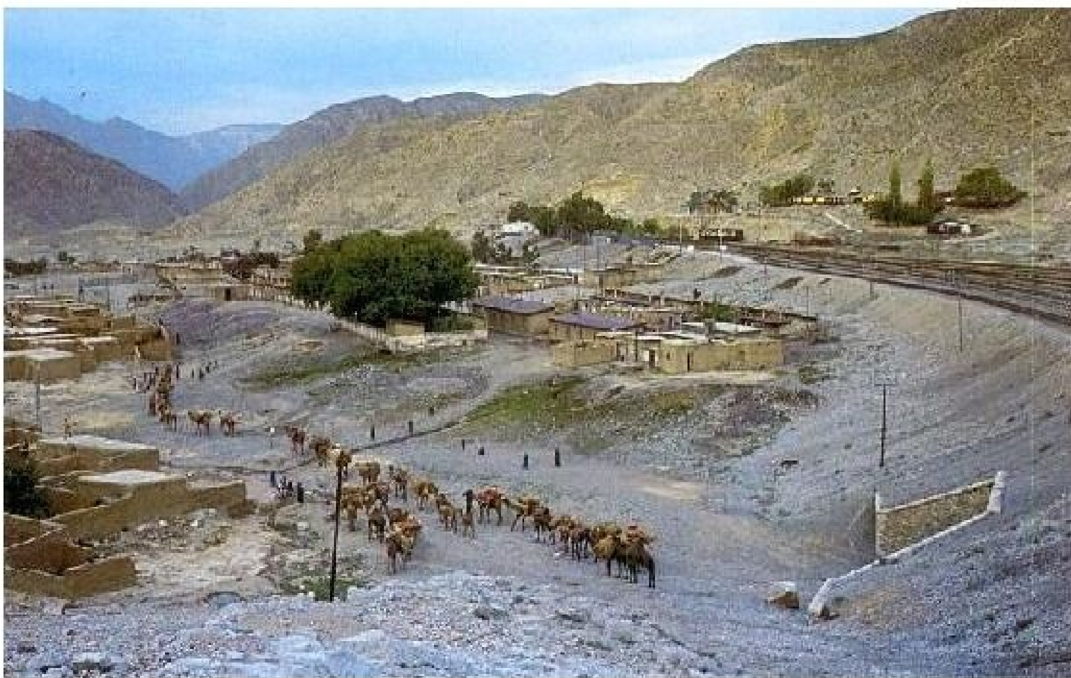
model that also does not suffer from the same



shortcomings as the one we designate as the 'conventional wisdom'. There are lot of facts in this convention and these cannot just be thrown out of hand just for nationalistic or other reasons. All this necessitates an open mind. While we must not consider the conventional wisdom as our dogma, we should not be entirely averse to this model. The spread of agriculture and pastoralism should not be pegged to the question of the 'origins' alone, it is primarily an issue of the spread of the Neolithic cultures within Baluchistan and Sindh as well as the spread of the staple crops to the far reaches of the country.

As far as the beginning of agricul ture in the Greater Indus Valley is con cerned, the commonly accepted theory has been that Indo-European PPNB farmers migrated eastwards from the Za gros across the Iranian plateau to Turk

menistan, Afghanistan, and Baluchistan,



A view of Bolan Pass, connecting Southeastern Afghanistan to the Indus plains

bring the art of agriculture with them. This hypothesis, the Levantine Primacy Mode,l was developed in the 1980s by Ofer Bar Yosef and Richard Meadow. It provides a cultural ecology explanation, based on the idea that some areas were better favored with domesticable plants and animals than others. This kind of model was first proposed, like the Neolithic colonization of

Europe, at a time when the archaeological evidence for early farmers was thin on the ground but it cer tainly no longer fits theories of agriculture beginning at the present time.

As will be seen in the next chapter, there has been a strong reservation to accept this paradigm in its totality; more and more alternatives are being proposed in recent years which attempt to skirt the issue of the Near East as a source of domesticated plants and animals. This is evolving into an active debate, occasionally into an acrimonious one. We shall delve into these arguments in the next chap
Apart from identification and geographic origin of Indus crops and domesticated animals, there is the question of chronology: when did the Indus people acquire them from outside or when did they first domesticate these plants and animals? Furthermore, if the spread of agriculture and pastoralism in Pakistan is taken to be a result of imports from the Near East, one wonders if the Near Eastern crops and domesticated animals came to the Indus Valley together or whether the pulses and linseed/flax diffused separately over a much longer period of time.

Recent archaeological discoveries in Baluchistan and western Sindh have produced sufficient evidence to reconstruct the various stages in the evolution of the food-producing communities in Pakistan and assign a credible chronology to them. Both the possibilities for import as well as indigenous domestication have been considered. The story begins around 7000 BC at Mehrgarh in the Kachi plain (see map above).

As stated above, for a long time the development of the Neolithic culture in Baluchistan, including the beginning of agriculture and animal husbandry, was taken as a result of human migration from the West, the so-called 'demic diffusion'. As new discoveries came to light, especially those from population genetics, however, this model lost its influence. The development of agriculture in the Greater Indus Valley is now seen more a result of indigenous development rather than a diffusionary wave from the West. The cultural adaptation, of course, played an important role in the process, as discussed in the next chapter.

A Short History of Archaeozoological and Archaeobotanical Research in Pakistan:
Archaeozoology (the study and interpretation of animal remains recovered from archaeological sites) in the Greater Indus Valley traces its beginnings to the late 1920s and early 1930s with the analyses by Colonel Robert Sewell (93) and Baini Parsad (94,95) of animal bone remains from Mohenjo-daro, Harappa, and a few other prehistoric sites in Sindh. Sewell and Prasad were both zoologists and (successively) directors of the Zoological Survey of India. Sewell noted for his analysis of the faunal remains from Mohenjo-daro: “So far as I am aware, this is the first occasion on which a thorough investigation of the animal remains obtained by archaeological excavation in India has been carried out”. He goes on to say: “it is therefore of no small interest to see to what extent such investigation can furnish data regarding the conditions in which the early inhabitants of these sites lived, and whether by means of such a study we can confirm or refute conclusions regarding these early peoples that have been drawn from other lines of evidence” (95).

Judging from the standpoint of modem scholarship, these goals were entirely laudable, although they were largely frustrated by the lack of stratigraphic excavations and by incomplete recovery of archaeofaunal materials. Solutions to these problems would come only later with the introduction of stratigraphic methods introduced by Mortimer Wheeler in 1944 and with the use of sieves to screen excavated sediments, a procedure still employed haphazardly across the subcontinent (96).

Two features of the work of Sewell and Prasad deserve notice here. One is that they frequently refer to the pioneering work of the Switzerland-based osteologist Johann Ulrich Duerst (1908) on the faunal remains from the site of Anau in modem Turkmenistan. The Anau project was the brainchild of the remarkable American mining engineer turned vocational archaeologist Raphael Pimply who led the first multidisciplinary archaeological team to excavate in the greater Middle Asia, predating by four decades the fielding of multidisciplinary teams by Robert Braidwood. The inclusion of specialist reports in archaeological monographs throughout the 1920s and 1930s can partly be attributed to the example set by Pimply in 1905-1908. The second feature that deserves notice is that neither Sewell nor Prasad cites the work of paleontologists who had been studying the remains of premodern faunas in South Asia for nearly a century, some of these remains being associated with stone tools.

Following the work of Sewell and Prasad, there were very few, if any, publications of faunal remains from South Asian Holocene sites until the 1950s. In 1953, one page of analysis of animal remains by J. C. George was included in Subbarao's "*Baroda through the ages*." Also, the year 1955 saw the first publication of the work of Bhola Nath of the Zoological Survey of India who published faunal reports until about 1955. In 1972, with the creation by H. D. Sankalia of a paleontological and bioarchaeological laboratory at the Deccan College Postgraduate and Research Institute, Pune, G. L. Badam joined that institution to work on Pleistocene remains associated with cultural materials. Unfortunately, the establishment of an extensive comparative collection of modern specimens was not sufficiently emphasized, and this essential aid to the identification of archaeofaunal materials remained underdeveloped at Pune until the end of the 1980s. Today in India the importance of comparative material has been recognized by zooarchaeologists (although perhaps not understood by most other archaeologists). There are growing collections of South Asian wild and domestic forms at both Deccan College, Pune, and M.S. University, Baroda, the two centers of Holocene faunal analysis in India.

In Pakistan, the situation has been different from that in India. There is no locally established tradition of the analysis of Holocene faunas from archaeological sites, with the result that almost all analyses were done by Western scholars. The first published faunal report is that contained in the Quetta Valley report of Walter A. Fairservis. Jr. (97); it was compiled by Fairservis on the basis of a number of analyses by different specialists in America. Following this, until the middle 1970s there is only the study of Therese Poulain-Josien of the fauna from Amri published in 1964 (98). By 1978, however, five collaborative Pakistani-foreign projects - with the Italians in Swat, the British in the Bannu Basin, the Americans at Balakot, Allahdino near Karachi, and the French at Mehrgarh - had included faunal analysts as members of their teams. Since then, faunal analysts were associated with the American-Pakistani team at Harappa and with the French-Pakistani team working in the Makran as well as in the Bannu Basin and nearby sites. Richard Meadow, associated with the French team, did a tremendous amount of work in this field, reviewing the zooarchaeological evidence for pastoralism in the Greater Indus Valley and neighboring Gujarat and Rajasthan from the period of the first known villages through the end of the Indus Civilization and published a comprehensive review in

collaboration with Ajita K. Patel (96). The work of Richard Meadow on domestication in the Kachi plains was truly pathbreaking. He made a good case for local domestication for zebu cattle and sheep by 6000 BC (96). Lorenzi Costantini contributed a lot to the knowledge of early agriculture in Pakistan, especially in relation to Mehgarh. In recent years the work of Vishnu-Mitre, Mandella, and D.Q. Fuller must also be recognized.

The Early Domestication of Plants and Animals in Pakistan: As should be evident from the material presented so far, especially in Section IV and the preceding chapters in the present Section, there is imperfect evolutionary history of the plants and animals that have been domesticated, even in the well-researched areas of the Fertile Crescent. The early history of goats and sheep, for example, is not known in sufficient detail for anyone to sit back and confidently believe that we know it all (5). The same might pertain to the evolutionary history of the winter grasses, wheat and barley, that were key species in early agriculture in the Near East, Central Asia, and Baluchistan. These plants just ‘show-up’ in the archaeological record at several locations. It is assumed that the varieties that we call ‘wild’ are generally pristine, having come into existence through natural selection completely independent of human intervention and that these wild plants and animals are the progenitors of the present-day domesticated forms. It is further assumed that domestication of wild plants and animals was possible in the area where early foragers found them in the wild. Still further, it is an article of faith that the current distribution of particular wild plant and animals is more or less the same as it was 10,000-12,000 years ago. This has prompted a number of detailed studies in the the modern distribution of these organisms. As said, this assumption is purely an article of faith. Is the contemporary distribution of wild wheat, for example, a good proxy for the distribution of this plant at the beginning of the Holocene? In spite of many assurances, we really do not know. May be it is a good proxy, but may be it is not (5).

If these uncertainties, assumptions, and beliefs are not enough, we may add one more: Although there could have been some plants and animals that were probably as important to the early farmers as wheat, barley, chickpeas, lentil, goat, sheep, and cattle, it is assumed that the today’s subsistence economy is an adequate guide for the formulation of archaeological research strategies.

There are a number of concerns that we need to address in connection with the early domestication of plants and animals in Pakistan. The first is, of course, the ecological setting of the area of Baluchistan, where we found the first inkling for plant and animal domestication, and its relationship with other areas, such as the Near East, where similar developments are known to happen in approximately the same time period. There is then the question whether the plants and animals, which later appear in archaeological record in domesticated forms, existed in the wild form. Add to it, the idea of discrete ‘Hearth of Domestication‘ that has plagued the interpretation of archaeological data for the past 100 years as well as complex matters of diffusion and independent invention.

As Gregory Possehl has noted (5), our human relationship with plants and animals is more complex than notions such as ‘domesticated/wild‘ or ‘hunting-gathering/food-producing‘ can accommodate. These relationships are on a set of continua or interaction zones which shift over time in an ecological and environmental context. They are not starkly defined in black and white, but involve complex shades of grey, which occasionally become dense enough to determine that a relationship has crossed some still poorly defined line suggesting ‘food production and domestication’. The issue of domestication of plants and animals in Pakistan or that of adoption of already domesticated plants and animals from coming from the West should be considered in this light.

Mehrgarh provides us an open window into the remote past of Pakistan, at least to the early stages of agricultural development in the Kachi plains. Multiple finds from this site also provide us with some bearings to informed speculation in matters of early domestication of plants and animals or their adaptation into the subsistence economy of the Indus people living in the eastern fringes of the Iranian Plateau.

A stage of sophisticated hunting and gathering, directly antecedent to the appearance of the village farming community, has not yet been defined well in Pakistan. Sites that are believed to date to the general time period ascribed to this level of hunting and gathering have been found but they are generally located in the dry zone of southern Sindh. These are temporary camp sites around dried up lakes and where no trace of agriculture has been found. Almost nothing is known of the time between the late Glacial Age at ca. 15,000 BC and the beginnings of Mehrgarh at ca. 7,000 BC (99,100). This phase might be thought of as comparable to the Kebaran Phase of the Levant (see Chapter V.1). The first period at Mehrgarh has fully developed domestic architecture based on mud brick, and this settlement appears to be comparable to the PPNB settlements in the Near East. These date from 7300/7200 to ca. 5800 BC, in agreement with the chronology used for Mehrgarh I (aceramic period). So while Mehrgarh is undoubtedly an early village farming community, there is also a sense that the excavations there have not documented the beginnings of this tradition, or the beginnings food production and domestication in the region. It is certainly nothing like a terminal hunting-gathering site with intensive collection of cereals, pulses and sophisticated hunting. When we meet them, these people were already farmers.

One of the serious methodological issues that archaeologists interested in the beginnings of food production and domestication must face up to is the manner in which this subsistence form can be identified. The shift from a mobile hunting and gathering economy to life in sedentary villages is certainly archaeologically detectable, but this does not help much with the identification of hunting-gathering people who were trying to cultivate and nurture some food plants and domesticate some animals while still leading a mobile or semi-sedentary life. Finding these temporary camps is much difficult than finding an early village. Because of this inherent difficulty and because of the lack of research activities, we do not have the benefit of examining any human community in Baluchistan, or anywhere else in Pakistan, which correspond to the Natufians of the Levant. All we have is aceramic level of Mehrgarh and this only provides us with the evidence of early agriculture on the banks of the Bolan River.

Thus, we do not have any hard facts relating to the domestication of plants and animals in the Greater Indus Valley. When we meet the Indus man in the beginning of the Holocene *ca.* 7000 BC in the Kachi plsain, he is already agriculturist and living in settled locations. There are, however, a number of theories, to be discussed later, that speculate on the “beginning” of agriculture in the Greater Indus Valley. The least acceptable is that Mehrgarh was merely a receiver of already domesticated plants and animals from some purported ‘Hearth of Domestication’, such as the Levant, or, conversely, it was center of domestication in itself without any reference to the region to its West.

Another finding of general significance to wider models of foraging-farming transitions is the evidence for the movements of resources over huge distances, linking very different kinds of farming and foraging societies. While there is no *a priori* reason why cereal and sheep/goat husbandry is not at least as old in this part of the distribution zone of the wild progenitors as in the better-researched parts of the hilly flanks of the Fertile Crescent, there is always a possibility that at

least some of the crops did in fact migrated from the West. The same is true of the gathering evidence that while several indigenous millets and pulses were probably domesticated in central and southern India, there is also the evidence that some of these crops did in fact landed on the subcontinental shores from East Africa. In short, whatever the intermediaries, Indus valley farmers may have acquired some of their crops from Mesopotamia (2,500 kilometers), some (the millets) from Oman (1,2500 kilometers) or East Africa (3,000 kilometers), and northern India (500 kilometers).

Spread of Agriculture in Pakistan: Today the great majority of the rural population of the region lives by agriculture, though many farmers also hunt game if they have the opportunity. The 'Eurasian' farming system predominates in Pakistan as well as the area to its west: the cultivation of crops sown in the winter and harvested in the spring *(rabi)*, such as barley, wheat, oats, lentils, chickpeas, mustard, and grass peas, integrated with animal husbandry based especially on sheep, goats, and cattle. A second system *(kharif)* takes advantage of the summer monsoon rains: crops are sown in the late spring at the start of the monsoon and harvested in the autumn. Rice *(Oryza sativa)* is the main summer or *kharif* crop (though millets and pulses are also key staples in some areas), grown wherever its considerable moisture needs can be met, commonly by flooding bunded or dyked fields in paddy systems. There are a hundred varieties of domesticated Asian rice, but the main one grown in the region is *Oryza indica*. Other *kharif* crops include native summer pulses including pea, green gram or mungbean, blackgram, horsegram, pigeon pea, and hyacinth bean.

This panoply of food plants is derived from different source regions, so a particular focus of scholarship critical to questions of agricultural origins has been on determining when and in what circumstances these plants were domesticated and their cultivation was spread all over this region. Similarly, the package of the domesticated animals throughout this region constitutes of goats, sheep, and cattle with some minor variations. Spread of these crops and domesticated animals within Pakistan is no longer a mystery as plenty of data is now available on this subject. Jarrige and his team has done extensive work on the development of agriculture in prehistoric Kachi plains and his model and the ramifications he proposes for the Indus system are particularly significant. Some other researchers have also concentrated on the Neolithic settlements in Baluchistan and Sindh. Synthesizers like Fuller (71) have tried to map the spread of agriculture to Indian Punjab and Gujarat and eventually to peninsular India.

As stated earlier, the site of Mehrgarh provides us with a generalized view of the beginning and spread of agriculture in Pakistan. First, at the earliest level, about 7000 BC, the people of Mehrgarh were ‘agriculturists’, partially if not fully. This means that they subsisted on cultivated plants and domesticated animals to a large extent although their main subsistence could have been still dependent on hunting-gathering. Second, by about 7000 BC, at the end of the aceramic Neolithic, cattle, sheep, and goat had been domesticated, and cattle breeding emerged as the dominant form of animal exploitation. Third, the domesticated naked barley, said to be a form well adapted to flood irrigation was being cultivated. Fourth, the storage of food is attested from the very early levels of excavations, going back to 7000 BC or even earlier. This, however, is not a proof of any agricultural surplus; it could as well have been the surplus of wild grain collected during the time of plenty. Finally, increased agricultural activities are noted in the growing size of settlement, number of storage buildings and the heaps of bone and other wastes around circular fireplaces indicating perhaps some degree of collective effort in agriculture-related activities.

For about three millennia, the mixed agriculture (seed agriculture and animal keeping) apparently

remained confined in the hilly flanks of Baluchistan where early farmers could have access to water the year round. A number of early settlements were established and several of them have been investigated. We shall discuss some of these settlements in the frets of the book.

A vigorous stage of agricultural dispersal seems to have started at the end of 5000 B.C. or the beginning of 4000 B.C. First, there is a marked change in the settlement in the sense that there are now more medium-sized settlements in the Kachi plains, as against one or two in the earlier period. The Mehrgarh settlement itself expands and moves to the south. The cultivation of naked wheat becomes important and this has been supposed to lead to a greater diversification of the economic base. There was also more emphasis on sheep and goat and the hunting of some specific animals, such as wild boar in the period.

On the basis of this evidence Jarrige (91) comes to a major conclusion: the development of a more diversified agricultural system in north Kachi coincides with a significant increase in the number of settlements all over the great Indus area, not only in the upland valleys of Baluchistan but also in the Indus Valley itself. The main argument lies in the clear and chronologically defined proliferation of settlements within virtually the whole of Baluchistan and western part of Sindh. It is during this period that the *gabarbands*, the age-old silt-holding device in Baluchistan, took roots. On the basis of the agricultural technology mastered over the preceding three millennia in the Kachi plain and elsewhere in Baluchistan, settlements could now appear in the Indus plains, all the way from western Sindh to Cholistan in northern Punjab, covering the western fringes of the Thar Desert.

Pothwar, Kashmir, and the upper reaches of the Pashtun country lagged behind in this progression. In fact, there is strong indication that these areas did not form a continuum of the so-called “South-Western” Neolithic culture that was initiated around Mehrgarh in Baluchistan. Instead, this region was experimenting with its own version of the Neolithic, the “Northern Neolithic Culture”, to be described a little later. It was eventually submerged into the larger cultural wave that originated in Baluchistan. Save a few pockets in Pothwar and Kashmir, by 3000 BC the South-Western package of crops and domesticated animals covered almost all of Pakistan and was capable of generating a substantial surplus on the strength of which the Harappan Civilization could rise ca. 2500 B.C.

Each of major crops and their varieties - wheat, barley, sesame, *jwar, bajra*, ragi, rice, sugarcane, etc. - are suited to particular types of soil and rainfall conditions on microlevel. Given the environmental variability of the Greater Indus Region, one suspects that several crops could have coexisted in a given area just as they coexist now. Secondly, as Chakrabarti proposes (81), the multicroping system which Jarrige takes back only to the beginning of the second millennium B.C. was in all probability rooted in the Early Harappan periods, during the fifth millennium BC. Moreover, still paraphrasing Chakarbarti, if the Early and Mature Harappans were familiar with canal irrigation, as it seems they were, the chance of the existence of a multicroping system increases manifold.

The final stage can be designated in the second millennium BC and has been postulated mainly on the basis of the evidence from Pirak, also in the Kachi plain. As Jarrige puts it: “the agriculture of the Harappan period is based on a system of winter crops well adapted to flood irrigation and animal husbandry was based on cattle, sheep, and goats. Thus, the agricultural system of the Harappan period can be viewed as the logical elaboration of a technology with its origin in the seventh millennium BC. With Pirak, however, we have evidence for a spectacular transformation to that multicroping system still characteristic of a large part of the Indian subcontinent today”. From Pirak, Constantini has

identified imprints and charred seeds not only of the winter cereals (wheat and barley), but also of such summer crops as rice, millet, and sorghum (16).

There is no reason to believe that the entire Pakistan or even Baluchistan-Sindh went through the development of individual crops synchronously. Evidence suggests that each of the cultivars may have appeared earlier in some areas than in others. Nevertheless, with these caveats in mind, the above framework is useful enough so that we can follow the spread of agriculture in west-to-east direction, and view the agricultural development in South Asia through Baluchi point of view. The stages are, it should be emphasized, ones of farming adaptation: they imply nothing about level of social and political development. They allow, in other words, for the simultaneous existence of tiny villages in Jhalawan in central Baluchistan and immense sites like Mehrgarh in the Kachi plains on the borders of Baluchistan with Sindh. In an extreme case, this also allows the existence of post-urban communities in Sindh and quasi-foraging bands on the fringes of the Thar Desert.

Two things stand out as we follow the dispersal of subsistence crops in Pakistan through time and space. First, the composition of crops changes as we move northward where monsoon rains are more frequent and winter rains diminish. There is an increasing proportion of summer crops in these northern areas; this includes the cultivation of millets and rice. Second, the intrusion of summer crops, particularly of Indian origins (mainly pulses and millets) is more and more noticeable as we move toward the Harappan Civilization and beyond. Hutchinson (3) emphasize that human subsistence activities are constrained by such environmental factors as timing, availability and amount of moisture, and atmospheric temperature that affect the density, distribution and duration of vegetative growth, as well as the kinds of plants and animals that can be raised. Being largely a desert region, the timings of rains and floods are of particular importance. Another important factor is temperature, particularly the presence of colder weather during the winter months in the northwestern zone of the alluvium.

This has permitted the growth of such characteristically West Asian crops as wheat, barley, peas, lentils and flax during the cooler *rabi* period of November/December through April/May. In contrast, the Asian or African crops such as rice, and the millets that require warmth, are *kharif* crops grown in the period from May/June through October/ November in the areas where the occasional monsoons provide the necessary moisture. The easy availability of river water through an extensive system of canals is of recent development and has very little bearing on the prehistorical development in this general area. Nevertheless, as will be shown below, the early cultivators of Baluchistan and Sindh were not oblivious of such a need and they did provide some irrigation wherever possible. Archaeological evidence for such *bunds* is particularly strong in southern Baluchistan. Of course, actual timings for planting and harvesting vary, depending upon the specifIc crop and upon local conditions that can differ signifIcantly even within a single district.

The implications of the Neolithic transformation for the regions to the east of the Indus system has also been tremendous, although considerably late in coming. These developments generally fall between 2500 BC and 1500 BC and are partially based on non-Indus crops. First, the availability of millet and sorghum permitted farming communities to expand onto soils which were not suited to the growth of such winter crops as wheat and barley. Millets allowed the inhabitants of the non-wheat region of the present-day India to be engaged in crop cultivation almost at par with those of the Indus Valley. Thus, although rather late, the ‘agricultural revolution’ did finally reach India and made the eventual urbanization of some of its parts possible.

History of the Staple Crops in Pakistan: The earliest seed crops in Pakistan - the so-called 'South-Western Package' or 'Foundation Crops' - are barley, wheat, chickpeas, and lentils, coupled with goats, sheep, and cattle as domesticated animals - virtually the same 'package' as we notice in the Fertile Crescent. Cotton is uniquely Indus crop although it may have originated in Oman or the extant Arabia or even East Africa; so is the water buffalo which was domesticated quite early on in the Indus Valley. Then came the various millets, Indian pulses and rice, decidedly imports and decidedly late. Chicken and pigs followed quite late in history, probably by the end of the Harappan Civilization. We do not know much about the pattern of dispersal of these latecomers, nor do we know the changing composition of the staple crops with time in diverse regions of the country. It seems that the proportion of barley continued to decrease and that of wheat to increase as the Indus cultures inched towards the Harappan Civilization, although barley remained the single most significant crop in Punjab even up to the composition of the RgVeda which mentions barley in the text but not the wheat.

The "South-West Asian" agricultural package, primarily consisting of emmer and einkorn wheats, barley, and probably lentil and chickpea, along with the domesticated cattle, goats, and sheep, was apparently well established in the Quetta valley up to the Kachi plains by the seventh millennium B.C. (6,7,90). By the time of Harappan urbanism this "South-West Asian" package was widespread throughout the Greater Indus Valley (8,15,88,89,90). It included wheats (*Triticum spp*.), barley (*Horduem vulgare L. sensu lato*), lentils (*Lens culinaris Med.*), chickpeas/gram (*Cicer arietinum L.*), peas (*Pisum sativum L*), grass pea (*Lathyrus sativus L.*), and flax/linseed (*Linum usi- tatissimum L.*). The only early Southwest Asian domesticates notably absent are the vetches and broad bean (*Vicia spp*.). The presence of the so-called South-Western domesticated plants and animals at Mehrgarh as well as the pulses and oilseeds known only from subsequent periods, strongly argues, in the opinions of the majority of archaeologists and prehistorians, for the "foreign" introduction of cultivation to Baluchistan at some period prior to the founding of Mehrgarh. Whether this process should be seen as cultural diffusion (adoption by local foragers) or demic diffusion (immigration of farmers) was left unanswered (71). As will be shown in the following pages, this consensus is now breaking down and some alternative scenarios are presently being developed.

The evidence is in the form of impressions in mudbricks together with some charred remains of plant parts found within bricks that had been accidentally fIred. Charcoal of any kind is rare in the aceramic Neolithic levels (the earliest Period IA) at Mehrgarh, and the eight samples that have been dated have provided results ranging from less than 4000 BC to greater than 8000 BC. Later Neolithic Period (IB) is rather more securely dated, to *ca.* 5300-4700 BC (seven calibrated determinations), and therefore dates going back into the seventh millennium do not seem out of place for the 11 or more building levels of Period IA (12). Of course, there is the site of Kili Gul Muhammad in the Quetta valley which is the next in importance, along with all its trappings, in tracing the beginning of the Neolithic in Pakistan.

For the next two to three millennia the evidence of this type of agriculture seems to be limited to Baluchistan, especially the Quetta Valley and the Zhob valley in the northeast of Baluchistan, the Kalat plateau in the central section, the Las Bela plain on the coast and the valleys in the hills which come down to it from the Kalat side, and the Kej valley to the north of the coastal ranges of Makran. Surface remains indicate the presence of agriculture and animal domestication also in the mound of Periano Ghundai near Fort Sandeman on the northeast and in the heart of the great mound of Dabar Kot, far to the southeast of Baluchistan in the district of Loralai. The evidence of very early settlements have also been found at the site of Rana Ghundai and in the little mound of Sur Jangal. De

Cardi identified this early phase in the northern part of southern Kalat at the site of Anjira. This distribution suggests a northern connection of early food producers, and this may well be true. By the end of 5000 B.C. agriculture is found spreading all over the major areas of Pakistan, starting from the plains of western Sindh. Thus, for the first 3000 years, the plot of the story revolves around Baluchistan, gradually involving the rest of the country without abandoning the center of its origins.

In 1982 Constantini examined the impressions in mud-brick from the earliest levels at Mehrgarh of ca. 6000 BC (15). They contained 95% barley and a small amount of wheat, which were attributable to both hulled (or glume) and naked (or free-threshing) varieties. The barley was largely naked, six-row barley, which thus shows some evolutionary advance over its wild ancestors (wild forms are two-rowed and hulled). Some wild barley was also reported. Some archaeologists take this evidence for the local domestication of barley but the co-occurrence of wild and domesticated forms of a plant, is insufficient to establish a local transition/ transformation from one to the other. As emphasized by Possehl (5), however, botanical research on wild relatives of crops and archaeological research into agricultural origins has been minimal in Baluchitsan and Afghanistan, and separate domestications in these regions cannot be ruled out (5).

The geography and environmental conditions of Baluchistan are more-or-less the same as that encountered in the ‘hilly flanks’ of the Fertile Crescent and this may as well offer a strong argument for the local domestication of some crops and animals, if not all. Lorenzo Costantini and Loredana Costantini Biasini have made the following observation that is pertinent to the promotion of the domestication of plants and the establishment of early village farming communities inBaluchistan:

“PhytogeographicallyspeakingtheBaluch territory as a whole is part of the Irano-Turanic region. The areas included in the Irano-Turanic region, with a continental climate of widely ranging daily and annual temperatures, low rainfall and two distinct seasons, i.e., hot dry summer and bitterly cold winter, are the northern portions of Baluchistan lying in the Irano-Anatolian or Armeno-Iranian province of the eastern Irano-Turanic sub-region. The vegetation of these territories is characterized by plant associations in which *Pistacia* am *Amygdalus* form the so-called 'steppe-forest' with trees and bushes extremely sparse and far apart. Like *Pistacia* and *Amygdalus*, the thicker formations of *Juniperus* also form 'steppe-forest. ... from the agroecological standpoint Baluchistan represents a transitional zone. Although including it among the Indo-Pakistan regions, Vavilov described a number of features it shares with the Irano-Turkestan area (16).

This is essentially the description of Baluchistan found in Section I of this book. As Jean-Francois Jarrige has observed, it may indicate that Baluchistan, possibly including the Pashtun country of Pakistan, along with Afghanistan, might have been part of a large geographical area within which the wild progenitors of potentially domesticable plants would have been found (102). These are characterized by the additional presence of pistachio *(Pistacia)*, almond *(Amygdalus)* and juniper *(Juniperus)* as significant elements of a steppe-forest in a climate with hot, dry summers and cold, wet winters. Thus, it is quite possible, indeed likely, that the domesticated processes that were occurring in the western ‘hilly flanks’ of the Iranian Plateau could have been at play in its eastern fringes as well.

Possehl regards the area spanning from the Mediterranean to the Indus as an “Expanded Nuclear Zone” of Southwest Asian agricultural origins (5,58,103). This means that the the individual crops that eventually formed the “southwestern package” could have originated at any location in this vast region. This would also include Baluchistan. The same would, naturally, apply to the package of

domesticated animals. If this premises is accepted, then the whole concept of the spread of agriculture from the Levant to the Indus evaporates into thin air and is replaced by a multidirectional spread that involves the spread of some crops and domesticated animals from the Indus to the Near East as the spread from the Near East to the Indus. This hypothesis, although logical in its broader sense, is nevertheless not yet backed by sufficient field research and is still controversial. In view of its potential importance, we devote a full chapter to examine this alternative in this Section.

Barleys: Dominating the plant assemblage of the earliest period at Mehrgarh)Period I) is naked six-row barley (more than 90 per cent of the seeds and imprints identifIed). Domestic hulled sixrow barley *(H. vulgare* subsp. *vulgare)* and wild and domestic hulled two-row barley. The naked-barley grains even from the earliest levels are with "a short compact spike with shortened internodes and small rounded seeds”. “These characteristics, not exhibited in completely domesticated plants, are very marked in charred barley seeds of the subsequent Period II and III” (17).

Fully domesticated barley appears in Mehrgarh remains near the same time as einkorn and emmer wheat, that is, prior to 7,000 BC. Archaeological remains of barley grains found at various sites in the Fertile Crescent indicate that the crop was domesticated about 8000 B.C.

The earliest domesticated barley occurs at Aceramic Neolithic sites in the Near East such as the Pre-Pottery Neolithic B layers of Tell Abu Hureyra, in Syria. The wild relative of the plant is known as *Hordeum spontaneum* C. Koch. The earliest evidence of wild barley in an archaeological context comes from the Epi-paleolithic at Ohalo II at the southern end of the Sea of Galilee. The remains were dated to about 8500 BC. The wild progenitor *H. spontaneum* is still colonizing its primary habitats in the Fertile Crescent from Israel and Jordan to south Turkey, Iraqi Kurdistan, and southwestern Iran. A few other habitats have been more recently discovered - southeastern Iran, and central Asia, includ



Two row barley (left) and six row barley (right)

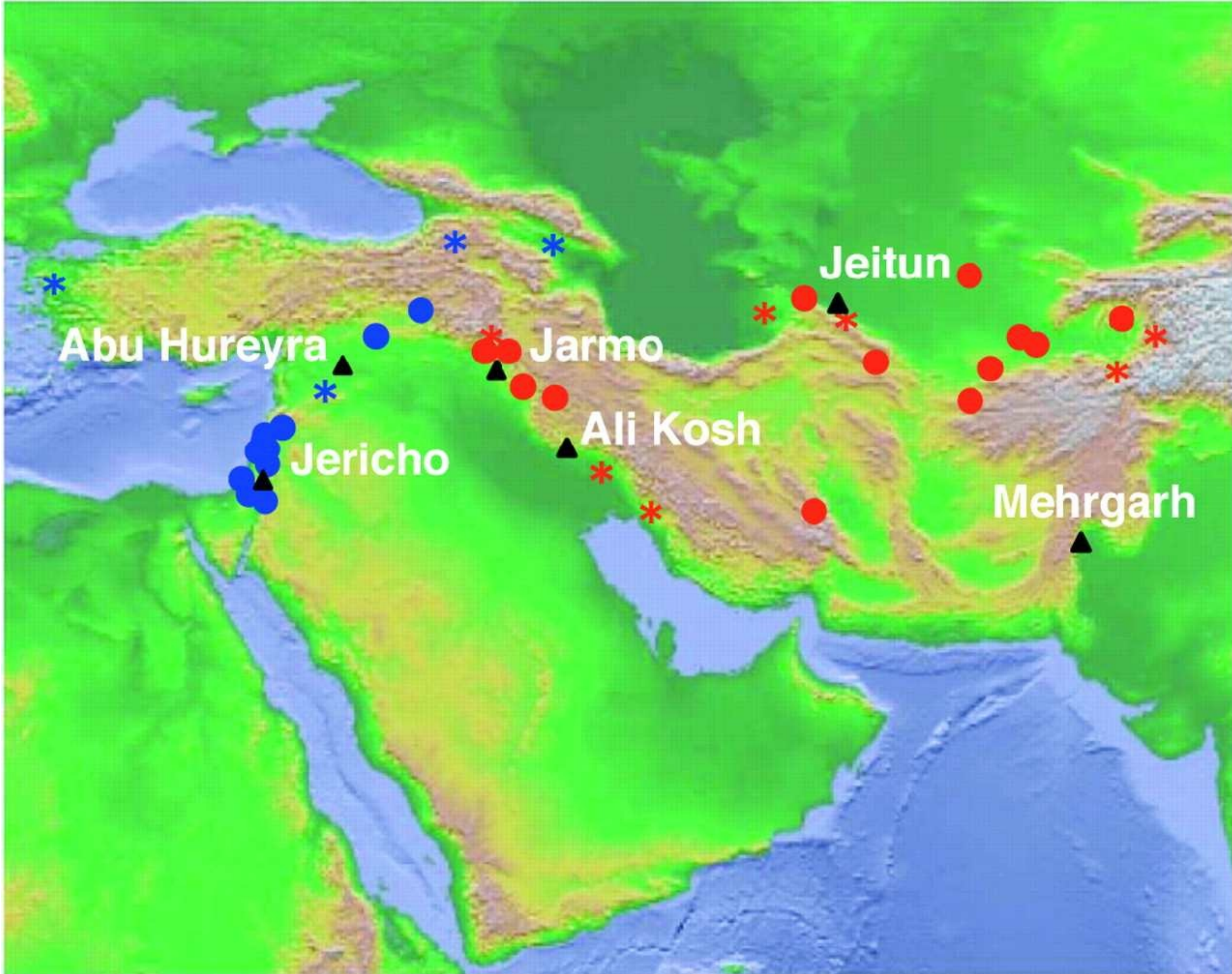




Domesticated Barley plant (top) and barley seed (bottom)

ing Afghanistan and the Himalayan region in particular. It ranges from North Africa and Crete in the west, to Tibet in the east.

Wild barley has a brittle spike; upon maturity, the spikelets separate, facilitating seed dispersal. Domesticated barley has non-shattering spikes, making it much easier to harvest the mature ears. As explained in Chapter III.4, the non-shattering variety seems to have evolved through selective



The geographic distribution of wild barley accessions and the locations of the Neolithic sites mentioned in the text that contain early evidence of domesticated barley. On genetic grounds Morrell and Clegg (101) inferred

that at least two domestications of barley; one within the

Fertile Crescent and a second 1,500-3,000 km farther east. The Fertile Crescent domestication (blue) contributed the majority of diversity in European and American Cultivars, whereas the second domestication (Red) contributed most of the diversity in barley from Central Asia to the Far East.

albeit unintentional, cultivation of the plant. Barley spikelets are arranged in triplets which alternate along the rachis. In wild barley only the central spikelet is fertile, while the other two are reduced. This condition is retained in certain cultivars known as *two-row* barleys. A pair of mutations result in fertile lateral spikelets. This produces *six-row* barleys. Hulless or "naked" barley is a form of domesticated barley with an easier to remove hull. Barley dominates the plant assemblage of the earliest period of Mehrgarh, the Period I. More than 90 per cent of the seeds and imprints have been identified as those of naked six-row barley; Domestic hulled six-row barley and wild and domestic

hulled two-row barley are present in much smaller amounts. Zohary thinks that the wild barley which is found at Mehrgarh in exceedingly small proportions is a "weed" form that extends southeastwards from the Near East to Baluchistan.

There has long been speculation that barley was domesticated more than once. This has been recently confirmed by Morrel and Clegg (101) in a comprehensive genetic study. They used differences in haplotype frequency among geographic regions at multiple loci and inferred to at least two domestications of barley; one within the Fertile Crescent and a second 1,500–3,000 km farther east. The Fertile Crescent domestication contributed the majority of diversity in European and American cultivars, whereas the second domestication contributed most of the diversity in barley from Central Asia to Baluchistan, probably even to the Far East. It is, therefore, possible that, in addition to the Fertile Crescent, barley was domesticated in Baluchistan, Afghanistan, or Tie-in area of Turkmrenistan. To counter this argument is the opinion that wild barleyhas not been identifIed from any deposits of a later period in Pakistan.

Wheats: Like barley, wheat is a grass. There are many kinds of wheat in the world today. The two most common are common wheat, *Triticum aestivum*, also known as *bread wheat* and accounting for some 95% of all the consumed wheat in the world today; and *durum* wheat *T. turgidum ssp. durum*, which is generally used in pasta and semolina products.



Close up of Durum Wheat

sets of chromosomes, but many are stable polyploids, with four sets of chromosomes (tetraploid) or six (hexaploid). Einkorn wheat is diploid. Most tetraploid wheats (e.g. emmer and durum wheat) are derived from wild emmer. Wild emmer is itself the result of a hybridization between two diploid wild grasses. The unknown grasses have never been identified among now surviving wild grasses, but the closest living relative is *Aegilops speltoides*. The hybridization that formed wild emmer occurred in the wild, long before domestiFrom their fIrst cultivation in the region, barley and wheat continued to be the principal food grains of Pakistan through the third millennium. It is still the principal food grain. Costantini (15) has made the point that the fIve forms of wheat and three forms of barley identifIed from the third millennium site of Nausharo - situated near Mehrgarh in the North Kachi Plain - indicate the existence of a



Cultivated Einkortn (*Tritium monococcum*)

Wheatisone of the first cereals known to have been domesticated and wheat's ability to self-pollinate greatly facilitated the selection of many distinct domesticated varieties. Recent findings

narrow the first domestication of wheat down to a small region of southeastern Turkey, where domesticated einkorn wheat has been dated to 9,000 B.C. But a more reliable C^{14} date from Abu Hureyra is between 7800 and 7850 BC. Recent genetic and archeological discoveries indicate that both *emmer* wheat and *durum* also originated from this same region of southeastern Turkey. Remains of harvested emmer from several sites near the Karacadag Range have been dated to between 8,800 BC and 8,400 BC, but it is not clear if these remains are from cultivated wheat or from collected ones.


Spikelets of a hulled wheat, einkorn

large genetic pool that was being tapped within the context of a sophisticated agricultural system exploiting "all areas suitable for tilling." This fIts well with our current understanding of prehistoric and early historic agricultural practices.

Wheat genetics is more complicated than that of barley. Some wheat species are diploid, with two



Cultivated Emmer wheat (T*riticum dicoccum*)

cation and was driven by natural selection. Hexaploid wheats evolved in farmers' fields. Either domesticated emmer or durum wheat hybridized with yet another wild diploid grass to make the hexaploid wheats, *spelt* wheat and *bread wheat*. These have three sets of paired chromosomes, three times as many as in diploid wheat.

At the start of neolithic agriculture, the two contributors that fused to form the hexaploid wheats seem to be geographically isolated and their chance of fusion in the wild was remote. If this be true, the formation of the hexaploid wheat must be within the fides of the Neolithic farmers. Additionally, keeping in view the areas of its genetic component varieties, most likely place of origin of hexaploid wheat should have been somewhere near the south-west corner of the Caspian Sea. Several additional lines of evidence point to the same conclusion.
lighter and spongier breads (such as for *naan* or *paratha* style breads), and has traditionally dominated the cultivation for bread-making in the Greater Indus Valley. *T. durum* is hardier, more drought resistant and generally provides a grittier flour less conducive to soft or leavened breads and often traditionally used in grits (*suji* or *rava*) and many sweets.

Although there is a possibility that local wild barleys could have been brought under cultivation in the Mehrgarh area, this is much less likely for wheat (6). There has been no morphologically wild wheat identifIed in any macrobotanical assemblage in Baluchistan or Sindh. Present in very low proportions in the Mehrgarh I samples are domestic einkorn, domestic emmer, and a free-threshing form that Costantini (15) states "can be referred to as *Triticum durum."* By Period II (mid-sixth millennium),

"the morphology of the seeds, although being within the range of variation of the tetraploid *Triticum durum,* shows characteristics of small-seeded forms. Not only does the morphology of the tetraploid wheat, which is probably dominant in Period II seem to shift towards as phaerococcoid form, but the hexaploid form dominant from Period V onwards also has a remarkable proportion of *Triticum sphaerococcum"* (15). Indeed, by the Harappan period (mid third millennium), three forms of hexaploid wheat dominate in the region what Costantini (15) calls *Triticum aestivum, T. compactum* and *T. sphaerococcum*. These wheats, and especially the last have been identifIed at sites throughout the Indus region from the Vale of Kashmir to eastern Sindh (15).

While the minutiae of identification of specific wheat types may seem inconsequential botanical detail, it is in fact potentially of great significance to cultural history. Where chaff remains have been reported, such as at Miri Qalat (104), Shortugai, Afghannistan, and Sialk, Iran (105), hexaploid wheats are present to the exclusion of tetraploids, in line with the modern situation in these areas. This, however, raises the question of when and where tetraploid wheat (T.*durum*) entered the Indus Valley and where and when it crossed with goat-face grass to yield the hexaploid variety. As explained above, Hexaploid wheats are derived from crossing of tetraploid wheats (e.g. *T. diococcum* or *T. durum*) with the goat-face grass *Aegilops squarrosa* which grows today in northern Iran, Transcaucasia and Afghanistan. We might expect this to have occurred prior to the introduction of wheat at the earliest period of Mehrgarh.

Different species of wheat not only represent separate origins and dispersals but also present different potentials in terms of ecological constraints and possibilities in cooking and consumption. Amongst the free-threshing wheats, Durum wheat (*Triticum durum*) is genetically tetraploid and distinct from soft, more glutinous, hexaploid bread wheats (*T. aestivum* and *T. sphaerococcum*). *T. aestivum* has superior bread-making qualities, i.e.


Modern cultivated cotton head

Cotton: Cotton presents a most interesting problem in the history of the Indus crops. The earliest finds of cotton fiber was in the form of a cloth preserved in the corrosion products of copper alloy and silv e r a r t i f a c t s f r o m Mohenjo-daro. There was no means of finding whether the fiber came from a cultivated plant or from a plant growing in the wild. This gave birth to an archaeological belief that the fIbers were from a wild species of the plant and that it was being exploited in the Indus Valley at least by the third millennium BC (106). These fIndings stood in isolation until Costantini (90) identifIed cotton seeds (Gossypium sp.) from Period lIB (ceramic

neolithic, *ca.* 5000 BC) at Mehrgarh. He termed the find "perplexing" and never elaborated on his identifIcations. This find pushed the date for the first appearance of cotton to ca. 5000 BC and likely a domesticate of this region (16,75,107).



***Gossipy arboretum* (tree cotton)**

This date was further pushed back to 6,500 BC in 2003 as a result of some pioneering work of French National Center for Scientific Research in Paris (108). The evidence came from a set of copper beads found next to the wrist of an 8,500-yearold skeleton in Mehrgarh. Jérôme Haquet and Benoît Mille of the French National Center for Scientific Research in Paris examined the beads and found microscopic traces of several cotton fibers. The fibers were probably once part of a cord that bound the hammered copper beads together into a bracelet. Metallic salts on the surface of the copper preserved the imprint of the threads from bacterial decay.

This find at suggests that the peoples of the region may have been among the first to recognize the potential of the cotton plant. "These people were agriculturalists and pastoralists: They tended goats and sheep and cultivated barley and wheat. This is a bit early for domesticated cotton, but it could probably have grown wild in the area at that time," says archaeobotanist Margareta Tengberg of the Sorbonne, who helped analyze the fibers at French National Center for Scientific Research (109).The native cotton, *Gossypium arboreum*, is believed to be a woody shrub and as such was likely to have been cultivated in perennial orchards like fruits, besides being available in the wild. The evidence is, however, not ironclad.

Hutchinson et al. (106) noted that although "cotton was fIrst used in the Indus valley, the cytogenetic evidence appears to be conclusive that the wild relatives of the earliest cultivated species are to be found among the African and Arabian regions. Cotton fiber has been directly dated to 4450 and 3000 BC from what may have been a pastoral camp in eastern Jordan. This now stands as the earliest evidence for domesticated cotton fIber in the Near East (6). This gave rise to the observation, repeated and amplifIed in subsequent publications, that the progenitors of the early cottons of the Indus valley must have been introduced from southern Arabia or north eastern Africa. This observation took on particular signifIcance when considered in light of the introduction to the Indus Valley of some kharif cereal grains (millets) from their African homeland. By the early 1970s, however, a dissenting view had arisen that now seems to dominate the thinking of many specialists (110). The current view agrees that, although there are major chromosomal differences that are impediments to the interbreeding of

African and Indus cottons, these probably did not occur after the domestication of the African form (*Gossypium herbaceum*). Instead, geneticists now generally prefer to postulate ancient natural divergence in the wild and independent domestication of the two species and perhaps even multiple domestications of different wild forms of G. *arboreum* [Indian cotton]" (105).

Cotton provides an example of the continuing debate over single and multiple origins for domesticated crops and animals. Stated simplistically, those who advocate single origins prefer to see one unbroken ramifying thread of antecedents to descendants from the time of the earliest domestication to today. Increasing variability would have occurred under conditions of intentional or unintentional human selection in the context of the exploitation of habitats that were increasingly diverse and marginal to the preferred habitat of the single circumscribed wild ancestral population. Plants and animals came to these habitats because people took them there. In contrast, those who advocate multiple origins would not necessarily deny the existence of a ramifying thread or the role of humans in transporting domestic forms, but would argue that there were originally many of these threads that intertwined to form a broad belt. Within the fabric of this belt, multiple domestications, introgressions, hybridizations, replacements of one form by another, and extinctions of forms have all occurred.

In this second scenario there is room for independent invention and for the spread of ideas and techniques without necessitating transport of the plants and animals themselves. In most areas of the world within the presumed natural range of possible wild ancestors it is not yet possible to reach a conclusion on which if either is a more useful perspective, because we lack assemblages that directly reveal the transition from hunting-gathering to cropping-herding. This is certainly the case for the Greater Indus Region, where even Mehrgarh does not extend back to pre-agricultural times.





Rice plant and kernels

Rice: Rice is an important staple food for a large part of the world's human population. Today, rice (*Oyrza* species) feeds more than half the world's population, and accounts for 20 percent of the world's total calorie intake. It grows on every continent and has 21 different wild varieties and two cultivated species. Rice is an integral part of many cultures folklore. In Myanmar, the Kachins were sent forth from the center of the Earth with rice seeds and were directed to a country where life would be perfect and rice would grow well. In Bali, Lord Vishnu caused the Earth to give birth to rice and the God Indra taught people how to raise it. And in China rice is the gift of animals. Legend says that after a disastrous flooding all plants had been destroyed and no food was available. One day a dog ran through the fields to the people with rice seeds hanging from his tail. The people planted the seeds, rice grew and hunger disappeared. In India Rice is often directly associated with prosperity and fertility, hence there is the custom of throwing rice at newlyweds. Also, rice is always the first food offered to the babies when they start eating solids or to husband by his new bride, to ensure they will have children

The two major rice varieties grown worldwide today are *Oryza sativa indica* and *Oryza sativa japonica*. According to research studies, they owe their origins to two independent events of domestication thousands of years ago. Historians believe that while the *indica* variety of rice was first domesticated in the area covering the foothills of the Eastern Himalayas, stretching through Burma, Thailand, Laos, Vietnam and Southern China, the *japonica* variety was domesticated from wild rice in southern China which was introduced to India before the time of the Greeks. Chinese records of rice cultivation go back 4000 years.

The Indian subcontinent is an important center of rice cultivation. The rice harvesting area in India is the world's largest. In Pakistan, rice is grown under diverse climatic conditions. Basmati predominates in traditional rice tracts of Punjab (zone 2). In Swat (zone 1) at high altitude mountain valleys, temperate *Japonica* rices are grown. In the South of the Pashtun country, Sindh and Balochistan (zones 3 and 4) IRRI type long grain heat tolerant tropical rices are grown.

The origin of rice has long shrouded by disparate postulates because of the pantropical but disjunct distribution of the 20 wild species across four continents, the variations in characterizing and naming plant specimens, and the traditional feud concerning the relative antiquity of rice in India versus China. Some of this confusion probably also stems from the assumption that all Asian rice derived from a single domestication, somewhere in the wild rice belt from eastern India across northern Indo-China or South China.This wide-spread belief is, however, based more on the presumption of single origins for crops in general, coupled with problematic archaeological inferences, than on any firm archaeological evidence.

Starting with the assumption that rice was domesticated once, there have been some rather extreme attempts to relate East Asian and South Asian archaeology, such as via comparisons between Neolithic China (sixth through fourth millennium BC) and Neolithic Kashmir (2500-1000 BC). Historical linguists have been trying to make sense of a vast array of potential rice words on the assumption of a single centre of rice origin from which such words ought to originate. Less explicitly reasoned attempts to link all of South and East Asian rice into a single story, are the grand narratives linking agriculture and language spread, in which the spread of rice from the middle Yangzi to India with demographically expanding and migrating farmers is argued largely on the basis of model assumptions rather than archaeological evidence. Any attempt to make a single narrative about Asian is, however, increasingly becoming untenable.

The available archaeological evidence suggests two distinct centers of early rice cultivation. In China, despite continuing controversies about the antiquity of rice use, cultivation, and domestication, it is widely accepted that rice cultivation was underway in the Middle Yangzi, and adjacent South China by the sixth millennium BC. While rice spreads down the Yangzi river and northwards into parts of central China, and probably the Shandong peninsula during this early period, archaeological evidence from further north, south or the upper Yangzi post-dates 3000 BC. On the basis of historical records and the existence of wild rices in China, Chinese scholars maintained that rice cultivation was practiced in north China during the mythological Sheng Nung period (ca. 2700 B.C.) and that *O. sativa* of China evolved from wild rices and the finding of rice glume imprints at Yang-shao site in north China (*ca.* 3200-2500 B.C.) during the 1920s reinforced the popular belief that China was one of the centers of its origin.

In India, an evidence of early domestication of rice in Belan region of central Gangetic valley froms as early as the seventh millennium BC has been claimed by Chakarbarti and other Indian archaeologists (probably on the authority of VishnuMittre) but it is hard to understand how a complicated crop like rice could have developed in the Gangetic Valley at a time when there is no sign of domestication of any other plant in the whole of India. More recently, Kharakwal et al. attempt to link cord-impressed ceramics with rice agriculture, suggesting hyper-diffusionism based on superficial similarities in ceramics, including the Jomon of Japan (a non-agricultural society), parts of Neolithic China of the early to mid-Holocene, and much later 4th to 2nd millennium BC material from the Ganges. All such hyper-diffusionist studies are flawed, not only because they stretch

archaeological logic by drawing comparisons across such vast areas and time-spans, but most importantly because they fail to take into account what we already know from botany about rice origins.

In south India the earliest date for cultivated rice is around 1400 BC, probably after its domestication in the northern plains. Cultivated rice is first mentioned in the Yajur Veda (ca. 1500-800 BC) and then is frequently referred to in Sanskrit texts. We shall leave here the debate on the domestication of rice in India to itself and concentrate on the situation in Pakistan.

The situation regarding the beginning of the cultivation of rice in Pakistan is not any better than India. It is certainly not an Indus domesticate: no evidence of wild or cultivated rice has been found in any Neolithic site in Pakistan, nor there is any sign of this cultivar in any Early Harappan excavation. The earliest remains of cultivated rice in Pakistan, in fact in the whole subcontinent, have been found in Swat (in the Pashtun country) and Pirak (on Baluchistan/Sindh border) in the second half of the third millennium BC. The presence of rice is definitely attested at Harappa in profusion during the middle of the third millennium BC, showing that its cultivation was widespread during this period.

The very fact that rice appears in such a big way in the Kachi plain in the very beginning of the second millennium BC is almost a certain indication of the fact that rice had been known for some time before this in the Indus Valley, because this is the only geographical region through which the cultivation of an eastern crop like rice could spread to the Kachi plain. Or was it really an ‘eastern crop’? There is no certainty about it because there are no firm archaeological data that can be chronologically compared with any degree of confidence. In fact, if we go by archaeological evidence, the cultivation of rice in Pakistan seems to be spreading eastward from Swat during the waning period of the Indus Civilization. As stated above, any firm archaeological evidence for rice cultivation in the ‘east’, that is, India, is of later dates. Thus, while it is probable that the cultivation of rice spread from east to west, there is also a good possibility that the cultivation of rice came to Pakistan from China, the original homeland of rice, via Central Asia. One possibility is that rice was brought to Swat from East Asia through the vast mountain massifs to the north and east which, as Stacul has so elegantly stated, "did not act as barriers, but very often corresponded to centers around which life and common traditions converged" (111). In this scenario, domestic rice would have moved westward from southern China through the mountains that border South Asia in the north, and been introduced to the lowlands of the Pashtun country from the northwest.

The report of rice from Harappa is also significant. Plant-opal phytolith analysis of samples from sediments, ash and pottery has led a Japanese team to identify both *Oryza* and *Eleusine* in Late Harappan Period samples (dating *ca. ca.* 1500 BC). In their very carefully worded report, Fujiwara et al. (112) also note the identifIcation of rice phytoliths in three pottery and two baked brick fragments that probably date to the Mature Harappan Period, as well as finger millet in one pottery fragment possibly of the same date. They state that the samples were too small to "give conclusive results" but that the "possible presence of rice and *Ragi* in the Mature Period should not be ruled out" (110). Presumably rice reached the Indus Valley during the later third millennium BC as part of exchange system. The question is: from the west, from the east, or from the south?

Millets: Millets are some of the oldest of cultivated crops, whose seeds are harvested for food or animal feed. All of them are summer crops, rather minor in to-day’s Pakistani context.The basic distribution of millets in Pakistan does not seem to show any specific pattern. The earliest horizon is

furnished by Pirak around 2000 BC and subsequent spread in Gujarat and Maharashtra in India almost during the same time. It is not at all clear whether the millets spread from Sindh to Gujarat/ Maharashtra or in the reverse direction. In both cases, the domestication area is definitely outside the subcontinent.

Some botanists trace the millets and sorghum to an African origin. The Harappan's contact with the inhabitants of Yemen or even with those of East Africa is generally deduced from their trade relations with Oman, who on their own were in contact with the world to their west. Thus, it is hypothesized that the millets came to Pakistan directly from Africa through Oman in the early third millennium BC, a period in which such trade relationships are archaeologically attested. The Jarrige's findings in Pirak, the dates of millet finds in Oman, and the dates of the contact between the Indus people and the Omanies correspond quite nicely, although some problems still remain. Nevertheless, the fact that it is found in Pakistan in a given period does not mean that there has to be a corresponding archaeological evidence of African contact. There are surely various indirect ways of plant migration, for example through land route along the Iranian coast.

Jarrige cites some other data which seem to be of more significance than the data generally quoted in favor of Oman. Chakarbarti also seems to favor this alternative approach. The cultivation of millet at Shortugai, its presence in the third millennium BC Central Asia, North Afghanistan and Southeast Iran has been archaeologically attested without any doubt. For example, at late third and second



***Bajra* , a member of the larger millet family of small grains, has been an important crop in northern Punjab till very recent times.**



Foxtail millet



***Jawar* (Pearl Millet) was another summer crop that supplemented the Indus crops of wheat and barley from the Harappan times onward.**



Broomcorn millet

millennium sites in north-west Pakistan are the "Asian millets *Panicum miliaceum* (broomcorn or common millet) and *Setaria italica* (foxtail millet). They are thought to have been brought in from the west, although the timing and route of entry remain poorly understood. Their domestic forms are known early in the Chinese Neolithic. Broomcorn millet is also well attested in the Neolithic of Europe and even in southeastern Iran at sixth millennium Tepe Gaz Tavila and in third millennium levels of Tepe Yahya (113). So far, however, it is not reported from sites of the Indus alluvium in the third millennium, although this may be attributable to unsystematic collecting protocols and dearth of analysis. Foxtail millet is also attested in Rojdi A, although there are not many seeds of it preserved

until second millennium Rojdi C. Wild forms of *Setaria* have been identifIed throughout the Rojdi sequence, underlining once again the need to consider the roles that local wild forms of domestic species may have played.

Given the intimate and sustained relationship of the peoples of Central Asia with those of the Indus Valley, and given such a high antiquity of the millets in this interaction zone, the cultivation of millets must have been an integral part of the Harappan crop system. In that context, the millets cannot be allowed the status of 'green revolution' crop in the Larter Harappan periods as Possehl has proposed (5). In both cases, that is, whether the millets were introduced to the subcontinent from Africa or from Central Asia, their spread to Sindh and then to Gujarat is predicated to be a spread in a west-toeast direction. Whether the Harappans acquired the African millets through trade with the Persian Gulf, Mesopotamia, and the Horn of Africa is uncertain, or through a trade route from southern Iran, is uncertain.

The integration of *rabi* and *kharif* husbandry regimes greatly increased the productive potential of Harappan farming, sustaining dense urban and rural populations in the Indus valley. As Jarrige (114) and Meadow (8) have pointed out, the cultivation of *kharif* crops may not only have opened up new areas for extensive farming on the periphery of the Indus Valley, but, on the alluvium itself, it may have made productive lands that were marginal to rabi crop agriculture. It is important to note, however, that the (admittedly poor) evidence to date permits the suggestion that not until the end of the Harappan Civilization were *kharif* cereals exploited in the Indus alluvial zone, even though they had been known for some 500 years in areas around its margin. This in turn leads to questions about the nature of Harappan society and agricultural practices, the control of productive resources, and ultimately the de-urbanization of the Indus Valley at the beginning of the second millennium.

Other Botanical Finds in the Greater Indus Valley: In addition to the 'founder crops', Mehrgarh provides evidence for dates, grapes and jujube that might have been cultivated or managed for fruit. Seeds ("stones") of dates have been identifIed from Period IB and II levels (ceramic neolithic) at Mehrgarh as well as from contemporary sixth millennium deposits at Tepe Gaz Tavila near Daulatabad south of Kerman in southeastern Iran. These are all single specimens, and although their contexts seem secure, they have not been directly dated to prove their antiquity. A much larger number of date stones has been identifIed from Nausharo, however, confIrming the earlier evidence from Mohenjo-daro that, by the third millennium, dates were exploited in areas such as Sindh, southern Punjab and southern Baluchistan, where they are commonly grown (15). Dates travel well, however, and thus it is not surprising to find their stones in sites situated in regions beyond where they are harvested. The status of the large true date seeds from Mehrgarh is problematic as they are uncharred and undated, but at the Harappan site of Miri Qalat in Makran wild type date stones occur confirming date consumption (and probably cultivation) in this region (104). Sesame is also domesticated in this region although the earliest finds are from the Mature Harappan period (115,116).

Cultivationofbothlentilsandlinseedis known to be of considerable antiquity in Southwest Asia where they were probably domesticated. They thus join wheat and probably barley as imported crops, although when they first arrived is not known. Also probably brought into the Indus Valley were peas (*Pisum* sp.), which have been noted from Late Harappan/Early Historic deposits at Rojdi as well as from Harappan-period levels at Kalibangan, Chanhu-daro and Harappa. The Chanhu-daro and Harappa identifIcations of *Pisum*, together with those of *Brassica* sp. and *Sesamum* sp., are now more

than half a century old and are undocumented by photographs or detailed descriptions. They thus require modern substantiation, although all forms are well attested by the second millennium at other sites in South Asia, as is *Cicer arietinum* (chickpea), which Vishnu-Mittre & Savithri have reported from third millennium Kalibangan.

Domestication of Animals in the Kachi Plains: As is evident from the above, the early evolutionary history of domestication of plants is imperfect; it is more so in the case of domesticated animals. The prevailing view, particularly in the Near East, is that at approximately the same time that agriculture emerged out of hunting-gathering, a parallel specialization seems to have appeared, that is, the herding of domesticated animals (117). This specialization, however, did not necessarily develop in the areas where seed agriculture was developing. This puzzle is still being debated.

The presence of goat, sheep, and cattle has been archaeologically attested in Pakistan and Central Asia long before their supposed domestication anywhere in the world, including the Near East. Judged from the bones found in some huntergatherers camps in Central Asia and those found in the early settlements of Baluchistan, the utility of goat and sheep as a source of food was quite wide spread. It is, however, difficult to say if these bones belonged to the wild or the recent domesticates.The wild animal remains that dominate the early levels of aceramic neolithic Period I (ca. 7,000 BC) of Mehrgarh reflect this situation with twelve large ungulates represented: wild sheep, and goats from the hills, chinkara from the foothills and plains, onagers and blackbuck from the drier plains, and nilgai, large deer, smaller deer, boar, water buffalo, wild cattle, and possibly elephant from better-watered zones.. There are some animals, such as camel and horse, which were domesticated in Central Asia quite early on but one does not find their trace in ancient Pakistan till very late in the early history of the region. The rock paintings in Chilas area in the north of Pakistan do depict domesticated horse and


Keeping of domesticated animals by agriculturists was most likely as ubiquitous in the Neolithic times in Baluchistan as it is today all over modern Pakistan.

dog, along with goat and sheep, but their exact chronological context has not yet been investigated. When did the domesticated cattle, goats, and sheep originate and where, is not known for sure: the evidence from the Near East, where most of the research has been undertaken, is mixed. The general impression is that animal domestication followed plant domestication and pastoralism as a distinct way of subsistence lagged one to two thousand years behind agriculture. However, this statement may not be applicable universally. The difficulty stems from the uncertainty in the identification of the bones of domesticated animals and distinguishing them from those of the wild. Additionally, some sites contain the bones of ‘domesticated‘ animals but they are absent from other sites in the same region.

The evidence from Mehrgarh in the Kachi plains of Baluchistan is somewhat clearer. It indicates that goats, sheep and cattle were most likely domesticated, at least at this site, as early as the late eighth

millennium or early seventh millennium BC. The humped bull seems to be of the Indus origin because its presence is not known west of Pakistan during that period of time. The original home of water buffalo is thought to be in China but the presence of this animal is clearly indicated in Pakistan right from the beginning of domestication of other animals, especially during the fifth millennium BC. Was water buffalo also, like the humped bull, a wild species indigenous to the Kachi plains? Since we do not see its presence, wild or domesticated, in Central Asia or in India at that early time period, the logic favors the answer as an affirmative.

Just like the beginning and spread of seed agriculture, the early evidence for animal domestication and pastoralism in Pakistan comes from Mehrgarh. This site, situated on the North Kachi Plain at the foot of the mountainous western edge of the Indus alluvium, is at an ecotone on the margins of foothill, plain and riverine environments. The wild animal remains that dominate the earliest levels of "a ceramic neolithic". From MR3 twelve species of big game have been identified. They include gazelle, swamp deer, nilgai, black buck, onager, spotted deer or chital, water buffalo, wild sheep, wild goat, wild pig and elephant. R. H. Meadow draws the following conclusion:

“First, a shift during the aceramic Neolithic from the hunting of wild animals to the keeping of domesticated sheep, goats and cattle; second, an increase in the importance of zebu cattle in relation to sheep and goats during the course of the aceramic and early ceramic periods; third, a revival of this trend during later occupations at the site; and, fourth, a decrease in the size of the individual domestic animals through time” (11).

The faunal remains from Mehrgarh are highly significant in that they demonstrate the progression from hunting to animal keeping economy. In the aceramic Neolithic the predominant animal remains are those of wild species, particularly gazelle, while sheep or goat are markedly less numerous, and cattle – whether wild or domesticated – are still less frequent. Thereafter, in successive stages, the position changes: gazelle becomes less and less common, while sheep and goat and later cattle increase in frequency, until these three domesticated species assume proportions in the economy comparable to those which they hold to this day.

The degree to which domesticates either spread to new areas from primary centers of origin or were independently developed at secondary locales during the Neolithic period is one of the major topics of archaeological and, more recently, genetic investigations. A matter of equal importance is the chronology of animal domestication or/and dispersal of already domesticated animals. Current evidence suggests that the Greater Indus Valley witnessed both the dispersal of domesticates from agricultural centers situated further west (such as Central Iran and Fertile Crescent) and the indigenous domestication of local species (74). One of the key Neolithic centers of the Old World was undoubtedly the Baluchistan region, where the arrival of new crops from the Near East 9,000 ears ago are thought to have prompted the domestication of more localized wild progenitor species, including the Indus aurochs, Bos primigenius namadicus - the purported ancestor of modern zebu cattle (Bos indicus) (12,118,119), and probably goats, sheep, and water buffalo. The wild sheep, goat, cattle and buffalo all comprise potential ancestral stock for the domestic forms in this region.

The increasing representation and decreasing body size of sheep, goats, and cattle - as shown by Meadow (11) - and an increasing proportion of bones of domesticated animals compared to the wild ones, is a convincing argument for local domestication was found to occur in two widely separated deep soundings and strongly supports an hypothesis of local domestication.

Intuitively, the evidence for local animal domestication contrasts with the crop evidence in Pakistan. While cereal agriculture appears to have been part of the repertoire largely introduced from outside, animal-herding appears to have developed locally. This is supported by archaozoological data for sheep, goats and cattle from Mehrgharh, and implied by recent genetic data for these and related animals from Southeast and Central Asia. Goats appear to have already been herded and domesticated animals in Baluchistan at the earliest known Neolithic period, although this is only documented in any detail from the site of Mehrgarh. The evidence for sheep also suggest local sequences of domestication but later than goats. The dynamic history of sheep, and the shifting frontier of ancient hair sheep and woolly varieties, remains to be written

The accumulation of phylogenetic research in livestock genetic sequences has called into doubt hypotheses of single origins in the Near East for any domestic animal. At present archaozoological data is still insufficient from many regions, for locating in time and space the several domestications postulated from genetics (120). Taking all this evidence together, more and more scholars now tend to agree that the domestication of animals, especially goat, sheep, and cattle, in Baluchistan was of indigenous origin and the diffusion did not play a significant role. Similarly, Pakistan is increasingly being included in a 'nucleus' zone for the domestication of barley and possibly wheat. Here too, the significance of diffusion is being ignored.

Just like the the staple crops of which some were introduced and some were probably indigenously domesticated, livestock shows a number of local domestications and the others acquired as domesticates. The accumulation of phylogenetic research in livestock genetic sequences has called into doubt hypotheses of single origins in the Near East for any domestic animal. At present archaezoological data is still insufficient from many regions, including much of South Asia, for locating in time and space the several domestications postulated from genetics. One exception is, however, Mehrgarh, where ample information is available to address the question of animal domestication and the development of pastoralism.

The best documented domestication of the Indus animals is that of *zebu* cattle inferred from metric changes in bones through the Mehrgarh sequence as well as distinctive humped cattle figurines (12) obtained from a number of archaeological sites. Goats appear domesticated from the earliest occupantion at Mehrgarh, but recent genetics suggests one or two domestications of goats additional to these and most likely originating in the Near East (121). Genetic evidence for sheep is similar, with a plausible domestication in Baluchistan (122) but also in the West. Another important domesticate of the Indus region is the water buffalo, which has been well-documented as a domesticate at more than one Harappan cities. These animals eventually became important in the subsistence economy of the Neolithic Pakistan as they did in the economies of Near East, Iran, Central Asia and later on to that of India.

Bos Indicus: Today, the majority of domestic cattle from Europe and North Eurasia are humpless taurine-like, whereas humped zebu cattle predominate in South Asia and Southeast Asia. Zebu cattle are also encountered in South China where hey are believed to have been introduced from domestication centers situated further west some 2,500 years ago. In contrast, taurine cattle are believed to have spread from Central Asia to Central and Northern China between 5,000 and 4,000 years ago (123,124). Through examination of mitochondrial DNA, autosomal microsatellites, and Y chromosome polymorphisms, the geneticists from Trinity College Dublin showed in 1990s that the principal genetic divide between forms of cattle is between *Bos indicus* (zebu forms) and *Bas taurus*

(European nonhumped forms). Furthermore, the degree of this divergence strongly supports biologically separate origins for the two domestic taxa. This opened the door to the consideration of indigenous domestication of cattle in eastern Iran or Baluchistan from local wild stock. These findings have been confirmed by some other researchers with regard to the indigenous local origin of of zebu, as reviewed by Grigson (118).

Although investigations of mitochondrial DNA (mtDNA) sequence variation have confirmed the independent domestic origins of Bos *Taurus* and Bos *Indicus* cattle from genetically divergent wild aurochs progenitors (125) and have shed much light on the ancestry of Bos *Taurus* cattle similar studies involving zebu mtDNA are limited. Nevertheless archaeological evidence clearly points toward the domestication of zebu cattle within the Indian subcontinent, although the exact geographic origins and phylogenetic history of zebu cattle remained uncertain till recent times when, a few years ago, Chen et al reported evidence from 844 zebu mtDNA sequences surveyed from 19 Asiatic Their data analysis conclusively shows for all domesticated zebu in the Indus Valley and nowhere else.

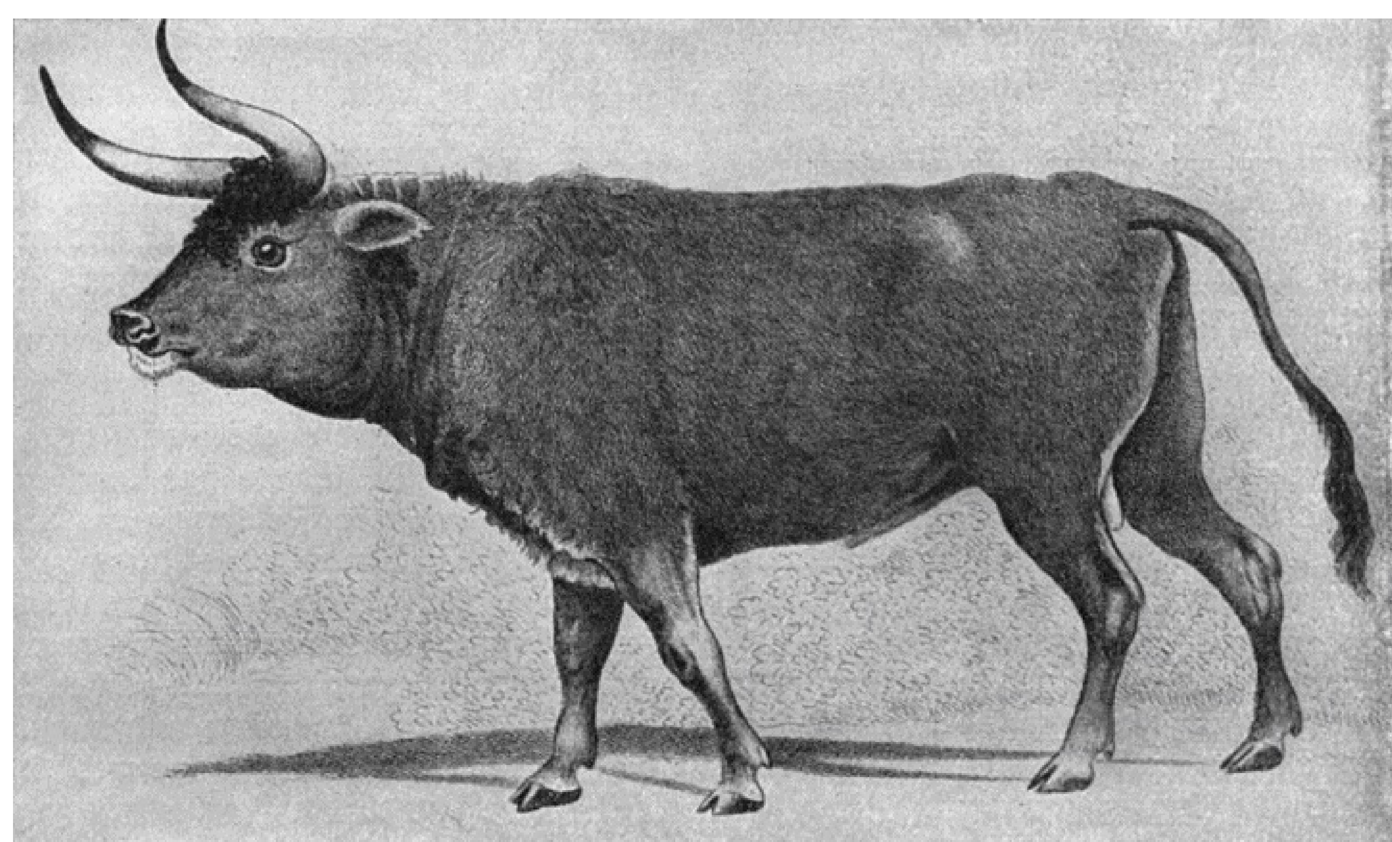
It is believed that *Bos primigenius nomadicus* ranged over the Greater Indus Valley and the adjoining area of eastern Iran during Pleistocene and Holocene periods and that some of their populations almost certainly survived into Neolithic times to give rise to Bos *indicus* (119). Evidence retrieved from the archaeological sites of Harappa and Mohenjo-daro indicates that domestic zebu were widespread throughout the Indus Valley region 5,000 years ago (71). In addition, both osteological countries. the origin



A Dhanni zebu bull (Bos Indicus) from Pothwar, northern Punjab, Pakistan. Note the prominent hump on the rear of the neck. This species of the cattle was most likely first domesticated in Baluchistan, from where it westward all the way to Europe and North Africa. A few thousand years later, this cattle also spread throughout India.

and figurine evidence indicate that zebu (humped) cattle *(Bos indicus)* were present at Mehrgarh and likely to have been the dominant form (11). At the time of the Neolithic transition, zebu cattle (Bos

indicus) were probably the most abundant and important domestic livestock species in the Greater Indus Valley. These findings confirmed proposals with regard to the indigenous origin of South Asian zebu (126).
More recently, South India has been proposed as another independent center of domestication within South Asia. This hypothesis is supported by the presence of a distinctive, cattle-oriented Neolithic culture in South India that produced hundreds of unique ashmounds (mounds of burnt cattle dung, see the foregoing chapter), but archaeozoological data on firming such a scenario are lacking. The observed morphological differences between cattle depicted in the rock art of South India and in the iconography of Indus Valley Civilization have led to suggestions that South India was a secondary center for zebu domestication (127). Other potential centers of zebu domestication, which likely featured a combination of allochthonous and autochthonous processes, include Gujarat and the Ganges region,



Copy of a painting of an Aurochs owned by a merchant in Augsburg in the 19th century. The original probably dates to the 16th century. Most of the present-day cattle breeds

in Europe and America stem from this animal, other breeds are crosse-breeds of the aurochs and the zebu.

where, according to archaeological data, domestic zebu were present 5,500 and 4,000 years ago, respectively. These dates are, of course, postMehrgarh where the presence of domesticated cattle has been indicated much earlier.

The domestication of cattle (*Bos taurus* and *Bos indicus*) has been traced back to wild aurochsen (*Bos primigenius*). The present cattle breeds point to at least two independent domestication events from two distinct aurochsen groups - taurine (*B. taurus*) and zebu (*B. indicus*). Archaeological data suggest that the zebu domestication most likely occurred in the Indus Valley (12,123) with a primary diffusion in India and Afghanistan while only a more recent (*ca.* 3,000 years) secondary introduction in Africa.

Conversely, the most likely domestication site for the taurine breeds is believed to be in a westernmost area in the Near East even though an independent domestication event may have also occurred in Africa (128).

Separate South Asian and West Asian origins for cattle have now been confirmed and augmented through a range of genetic and phylogenetic studies. Morphological comparisons by Grigson (126) revealed allometric relationships between the bones of Pleistocene fossil *Bos namadicus* and *Bos indicus* (modern zebu) on the one hand and *B. taurus* (taurine domestic cattle of Southwest Asia and Europe) and West Eurasia fossil *B. primigenius* on the other hand, suggesting that the two domestic cattle types derive from two distinct species of wild cattle. This work augmented the earlier arguments of Zeuner (120). Phylogenetic evidence from DNA is also clear in indicating a separate domestication of humped zebu cattle from Near Eastern taurine cattle (73,129,130,131,132).



The origins of *zebu* cattle in the Greater Indus Valley and its spread to West Asia and Europe

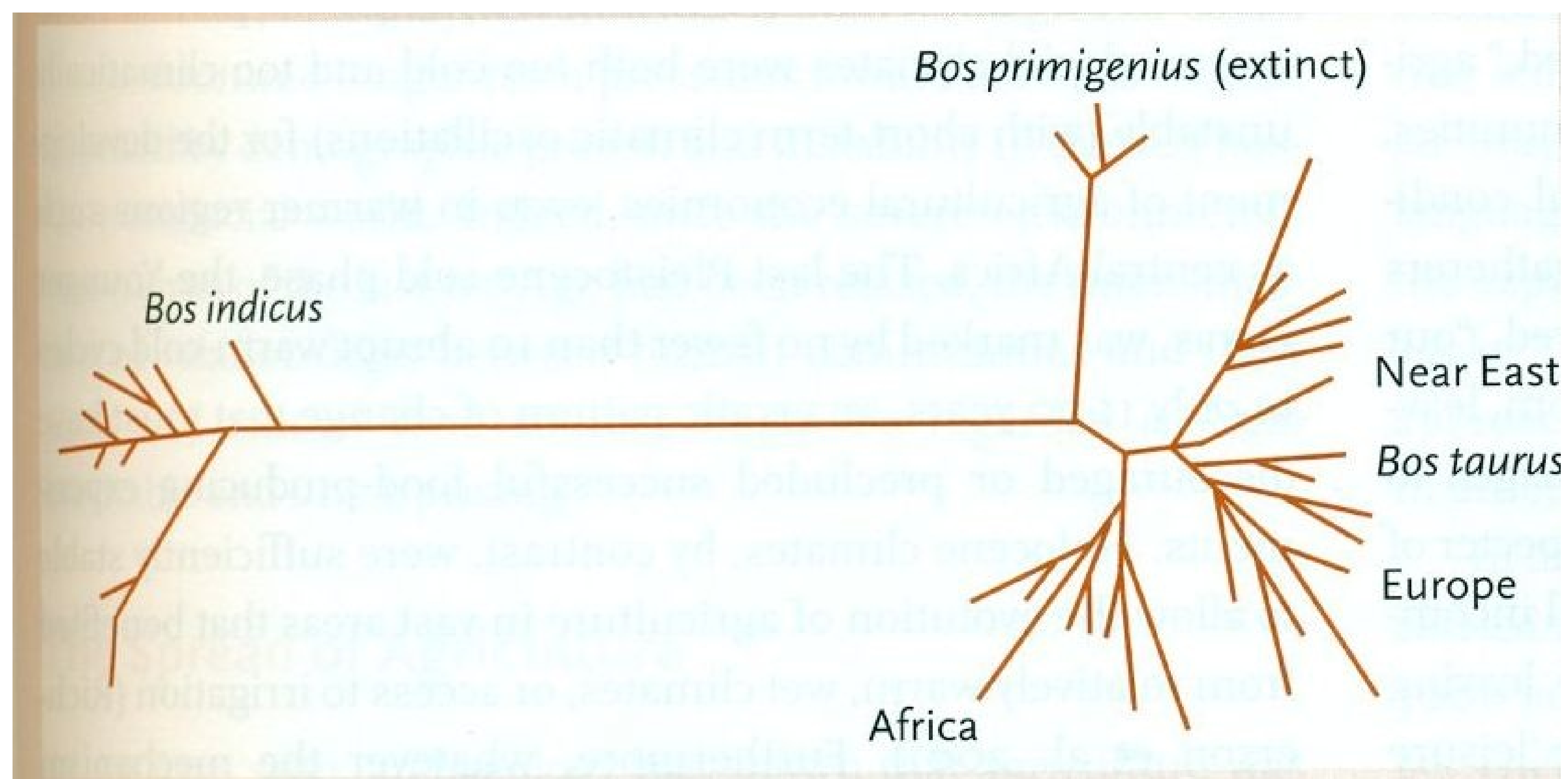
to before 6200–6000 BC, and may start *ca.* 7000 BC or somewhat earlier (133). The subsequent Period II is well dated as starting from 6000 BC. In the earliest level, true wild taxa (i.e.taxa which were never domesticated) made up about 55% of the assemblage (8,12). This declines in succeeding levels, where proto-domesticates, primarily sheep and cattle, increase in importance to ca. 80% of the assemblage. *Bos* alone changes from 4 to 38% to 65% by *ca.* 5000 BC. This dramatic rise in the importance of certain animal species suggests the gradual emergence of specialized predation, like that of herding. This trend is accompanied by a size trend in which the average size and size range of *Bos* and *Ovis* decreases through the sequence. There is no sudden shift, but rather the suggestion of a statistical trend of change in these two species, while wild taxa such as gazelle do not undergo any change. This is the same kind of data available from domestication in the Near East.

Sheep: The domestication of sheep and goats is not as simple as that of the cattle. The history of the domesticated sheep, Ovis *aries*, traces back to between 11000 and 9000 BC, and to the domestication of the wild mouflon in the geographical area not exactly known. Sheep are thought to be one of the first animals domesticated by humans, and there is evidence of sheep farming in Iranian statuary dating to that time period. These sheep were primarily raised for meat, milk, and skins.

In a publication, Beja-Perrier et al (128) have shown that the modern and ancient mtDNA sequences do not support the currently accepted hypothesis of a single Neolithic origin of Bos *taurus* in the Near East. The processes of livestock domestication and diffusion were certainly more complex than previously suggested, and their data provide some evidence in favor of the hypothesis that the origin

of European cattle is multiple. Breeds domesticated in the Near East and introduced in Europe during the Neolithic diffusion probably intermixed, at least in some regions, with local wild animals and with African cattle introduced by maritime routes. As a consequence, European breeds should represent a more diverse and important genetic resource than previously recognized.

Most of the cattle breeds in Pakistan and the surrounding regions derive from zebu stock. Within Pakistan, Pothwar seems to have played a dominant role in the development and dispersal of the zebu cattle: the *Dhanni* bulls from this area are still prized and sought for. Archaeological evidence for the transformational process leading to morphological domesticates is well illustrated by Mehrgarh's cattle evidence. The earliest levels (Period I), despite inconsistent radiocarbon dates, date



The genetic tree of the origins and spread of cattle through the Old World.

Woolly sheep began to be developed much later - around 6000 BC in Iran.

The exact line of descent between domestic sheep and their wild ancestors is unclear (134). The most common hypothesis states that Ovis *aries* is descended from the Asiatic (Ovis *orientalis*) species of mouflon. For some time the ancestor of sheep was considered the European Mouflon (Ovis *musimon*) but later research showed that it was an ancient breed of domestic sheep turned feral rather than an ancestor of sheep. Archaeological data suggest two different areas with independent sheep domestication events in Turkey and Iran. Southern Levant region of southern Syria, western Jordan and Israel has also been suggested as a center of sheep domestication. Similarly, Pakistan, especially the Bolan Valley on the strength of Mehrgarh findings, has also been variously mentioned.

Cytogenetic studies suggest that modern domestic forms are all descended from a single ancestor related to the current Southwest Asian population of mouflon (135). This would seem to preclude a separate origin in Central Asia or Baluchistan where the local wild species of mouflon today is the urial *(*Ovis *vignei).* Archaeological evidence from the earliest level of Mehrgarh, however, indicates that the sheep, along with the goat, was being domesticated at this location from the very beginning of the settlement. Meadow (6) has convincingly shown that the bones of domesticated sheep increased

and those of wild animals progressively decreased as the time went by. The size of the domesticates also decreased gradually. Both of these factors indicate an ongoing domestication process.

It is possible that the former range of the mouflon extended from the southern Zagros all the way to Baluchistan. It is also possible that sheep domesticated in Baluchistan from the urial were replaced later by imported Southwest Asian domestic forms descended from the mouflon (136). Gradual decrease in the size of sheep at Mehrgarh continued well into Mehrgarh Period III (fifth millennium B.C.) and then stabilized with relatively small animals being the norm at least into the second millennium in that region (at the sites of Sibri and Nausharo situated near Mehrgarh). At Harappa in Punjab, however, very large domestic sheep occur in third millennium B.C. Harappan phase deposits are contemporary with those at Nausharo (137).

Along with goats, sheep (*Ovis aries*) were among the first animals to be domesticated by humankind; conventional sources provide a domestication date between nine and eleven thousand years ago in Mesopotamia. The exact line of descent between domestic sheep to their wild ancestors is presently unclear. In past literature European mouflon (*O.musimon*) has been commonly cited as ancestor to the sheep. However, later studies converged on the hypothesis that *Ovis aries* is descended from the Asiatic (*O.orientalis*) species of mouflon. It has been proposed that the European mouflon is an ancient breed of domestic sheep turned feral rather than an ancestor. The urial (*O. vignei*) was also once thought to have been a forebear of domestic sheep, as they occasionally interbreed with mouflon in the Iranian part of their range. However, the urial, argali (*O.ammon*), and snow sheep (*O.nivicola*) have a different number of chromosomes than other *Ovis* species, making a direct relationship implausible. Phylogenetic studies showed no evidence of urial ancestry.

Cytogenetic studies suggest that modem domestic forms of sheep were all descended from a single ancestor related to the current Southwest Asian population of mouflon *(*O.*orientals)*. This would seem to preclude a separate origin in South Asia. However, it is possible that the former range of the mouflon extended from the southern Zagros to the Indus Valley.

The origins of sheep is, however, not that simple. Other studies comparing European and Asian breeds of sheep showed genetic between Two explanations for this phenomenon have been posited. The first is that there is a currently unknown species or subspecies of wild sheep that contributed to the formation of domestic sheep. A second hypothesis suggests that this variation is the result of multiple waves of capture from wild mouflon, similar to the known development of other livestock. In this respect, the evidence from Mehrgarh is pertinent. Bone evid e n c e f r o m Mehrgarh indicate a sheep domestication process in this region (12). The size reduction of animals is commonly held as a sign of domesticat i o n p r o c e s s . A gradual decrease in the size of sheep at Mehrgarh continued well into Mehrgarh Period III (fifth millennium B.C.) and then stabilized with relatively small animals being the norm at least into the second millennium in that region (at the significant

differences the two.



Asiatic mouflon is generally credited to be the ancestor of sheep. Mouflon's range is vast, ranging

all the way from Cyprus to the Indus Valley.



Urial, found all over Pakistan and the surrounding areas to its west, was once thought to have been a forebearer of domestic sheep, as they occasionally interbreed with mouflon in the Iranian part of their range. Modern genetic studies have , however, found this hypothesis

implausible.



The Markhor (*Capra falconeri*) is a goat-antelope found in sparse woodland all over western Pakistan

sites of Sibri and Nausharo situated near Mehrgarh). This indicates a process of local domestication and a plausible domestication of sheep in Baluchistan (122). The depiction of the head and horns on pottery at several Kot Diji sites during the fourth millennium BC is an other indication of its domestication.



The Markhor, a widely believed ancestor of goats, is widely spread in Pakistan and in central and South-West Asia.

Some parts of Pakistan today have longtailed fleece sheep, which represent a selectively bred domesticate, presumably introduced in Harappan or post-Harappan times. Baluchistan as well as the Pashtun country today is inhabited by fat-tailed sheep, possibly also a later breed, which is known in the Middle East in the second millennium BC. Thus while some sheep may have been domesticated in Pakistan there were at least two later waves of new breeds. Gene flow between these introduced breeds and the hair sheep already present may account for the chromosome count of modern domesticates of Pakistan.

Goats: Goats are among the earliest animals domesticated by humans. Domesticated goats (Capra *hircus*) demonstrate remarkable genetic uniformity worldwide; perhaps they were commonly traded in ancient times, which dispersed the population to Europe, Africa, and Asia. Later, they provided a convenient source of milk and meat aboard the ships of European explorers, who introduced goats to the New World Today there are more than 300 breeds of goats, and they live in climates ranging from high altitude mountains to deserts.

Goats have fulfilled agricultural, economic, cultural, and even religious roles from very early times in human civilization. They are the most adaptable and geographically widespread livestock species, ranging from the high altitude of the Himalayas to the deserts of Sindh and the coastal areas of Baluchistan. Goats played a central role in the Neolithic agricultural revolution in Pakistan and the spread of urban civilization in the Greater Indus Valley.

The wild Bezoar (Capra *aegagrus*) is generally considered the ancestor of the domesticated goat. Wild Bezoar goats once roamed from South Asia to Crete. The earliest remnants of domesticated goats dating 10,000 years ago are found in Ganj Dareh in Iran. Goat remains have also been found at archaeological sites in Jericho, Choga Mamil, Djetun and Cayonu dating between 8000 and 9000 years ago.

Pakistan contains numerous domestic goat breeds, but until now there has been no comprehensive study on genetic diversity or a phylogenetic analysis of Pakistani goats.The earliest remnants of wild as well as domesticated goats have been found at aceramic level of Mehrgarh, ca. 7000 BC. This gives credence to the speculation that Baluchistan may have been one of the centers of goat domestication. To judge from the occurrence of infant goats as offerings in a number of burials, however, goats are likely to have been domesticated even at the beginning of Period I, which may date to sometime in the seventh or even e i g h th m i l l e n n i u m B.C. The domestic status of at least some goats is confirmed by the presence of the remains of relatively small subadult and adult animals in contemporary trash deposits. A decrease in body size of the grown or nearly grown animal is one characteristic of early domestic bovids. Goats are also the single most common animal represented in the early Period I ass e m b l a g e s a f t e r chinkara, which, in contrast, show no size diminution.

Despitethe archaeological evidence from Mehrgarh, the domestication of goat remains uncertain and controversial. For example, while Meadow (12,138), discounts the possibility of domestication of goat in Baluchistan, believing that the earliest aceramic Neolithic goats in the Lower Indus valley appear to have been imported from a nearby western area, in a later publication he suggests that an independent domestication in Pakistan gave rise to the Cashmere breeds (6). This domestication probably happened in the northern regions of Pakistan from the local wild Ibex population,

commonly known as Markhore (Capra *falconeri*) (6). On the basis of these remarks, Ibex was generally thought to be the ancestor of some early breeds of goats in Pakistan, especially in the



An ibex is an individual of any of several species of wild mountain goats (genus Capra), distinguished by the male's large recurved horns, which are transversely ridged in front. Several species of ibex are found all over Pakistan, of which Sindh Ibex is better known. It is considered to be another candidate for the ancestry of the goat but a recent genetic study has shown that no Pakistani breed of goats was related to the Sindhi ibex depicted above.

South of the country. This hypothesis was, however, conclusively proven wrong by Sultana et al (139) who analyzed the complete mitochondrial DNA Dloop and the cytochrome *b* gene of 13 Pakistani domestic goat breeds (*Capra hircus*) and one wild goat, the Sindh Ibex (*Capra aegagrus blythi*). The phylogenetic analyses and sequence divergence (SD) established four distinct mt-lineages termed as *A*, *B* and *C* and a new lineage *D*. The Sindh Ibex appeared as an outgroup of domestic goats.

Goat populations are surprisingly less genetically structured than cattle populations. In goats only ≈10% of the mtDNA variation is partitioned among continents. In cattle the amount is ≥50%. This weak structuring suggests extensive intercon



Herding of goats is still the mainstay of pastoralism in Pakistan, Afghanistan and Iran, utilizing the marginal land where seed agriculture is not possible

from high altitude mountains to deserts. Presentday Pakistan contains more than 34 recognized breeds. This categorization is, however, based largely on physical appearance and anatomical features rather than on a detailed analysis of their genetic make-up.

The presumed centers of domestication for goats are diverse and it appears that goats may have been domesticated at more that one places: the Euphrates river valley at Nevali Çori, Turkey (ca. 11,000 years ago), and the Kachi plains at the eastern end of the Iranian Plateau on the border of Sindh in Pakistan, sometimes before 9000 years ago. Other possible sites of domestication include the Zagros Mountains of Iran at Ganj Dareh (ca.

tinental transportation of goats and has intriguing implications about the importance of goats in historical human migrations and commerce.

Goats are among the earliest animals domesticated by humans. Major genetic source of modern goats is believed to be the Bezoar goat; distributed from the mountainous regions of Asia Minor across the Middle East, all the way to the eastern slopes of the Iranian Plateau bordering Sindh. The earliest remnants of domesticated goats dating 10,000 years ago are found in Ganj Dareh in Iranian Kurdistan. Goat remains have been found at archaeological sites in Jericho, Choga, Mami, Djeitun and Cayonu; dating the domestication of goats in western Asia between 8000 and 9000 years ago. In Pakistan, the bones of domesticated goats have been dated to the establishment of the Neolithic Mehrgarh in Baluchistan *ca*. 9000 years ago.

Today there are probably more than 300 breeds of goats, and they thrive in climates ranging

10,000 years ago) and perhaps central Anatolia (ca. 10,000 years ago). Some other sites with evidence for the initial process of goat domestication have also been mentioned in archaeological literature, such as Cayönü, Turkey (8500-8000 BC), Tell Abu Hureyra, Syria (8000-7400 BC), Jericho, Israel (7500 BC), and Ain Ghazal, Jordan (7600-7500 BC). There is strong evidence from northern Afghanistan also for the very early domestication of goats and sheep, perhaps earlier than any other place in South-West Asia.
T h e e v i d e n c e f r o m Mehrgarh is pertinent: it strongly suggested the

possibility of domestication of goats in the Kachi plains. The earliest levels at Mehrgarh include some

very small goats, in addition to young goats buried with people, both of which suggest that goats were introduced locally as domesticates. The short-eared goat breeds of Sindh probably represent descendants of the original domestic stock, while lopeared, screw horned varieties of Baluchistan and northern areas represent a later introduction. Some studies hint that domestication in Pakistan could have given rise to the cashmere breeds (140).

Given such a large number of possible centers of domestication and such a vast time span, the ancestors of the domesticated goat has so far not been recognized without a controversy. Earlier mtDNA research suggested that all goats are descended from similar animals, such as Markhor and Bazoar but no clear lineage has yet been defined. Despite the lack of archaeological evidence, recent genetic studies on modern goats indeed suggest multiple domestications of this species, probably three, with one of these genetic lineages restricted to central, south and eastern Asia. This would suggest that there remains a domestication to be discovered archaeologically, perhaps in Afghanistan.

In a relatively recent genetic study on some of the Pakistani goats, Sultana (139) analyzed the complete mitochondrial DNA D-loop of 13 Pakistani domestic goat breeds (*Capra hircus*) and one wild goat, the Sindh Ibex (*Capra aegagrus blythi*). The result suggested that at least four different strains of wild *Capra* might have been the source of the modern domestic goats in Pakistan and that the Sindhi Ibex was not one of them. The archaeological indications at Mehrgarh remains a logical choice as one center of domestication for goats. This pushes back the date of domestication of goats in Pakistan prior to 7000 BC.

Water Buffalo: One of the major animal domesticates of Asia is the water buffalo. Its association with wet rice agriculture in China and Southeast Asia is well-known. Biological and archaeological evidence, however, suggest two separate origins. They are recognized, based on morphological and behavioral criteria – the river buffalo of the sub

**The water buffalo is known in the Indus archaeological record from the early Neolithic. It is, however, not yet clear of it was domesticated or wild or if it was domesticated indi**

swamp buffalo (142) . Their study supports the following scenario of the river buffalo domestication. Domestic river buffalos have been derived from the same stocks through a complex process. During domestication and/or afterwards there might have been a continuous influx of maternal variability from the wild buffalo into the domestic stocks. The time of expansion of at least one of the several expanding haplotypes was estimated to be 6300 years ago. “If the river buffalo was domesticated in the Indian subcontinent, as has been suggested by archaeological studies, the Western region appears to be the most likely candidate region (141).

Water buffalo were probably wild throughout most of South Asia, although today wild populations remains a rarity. Archaeological finds of wild water buffalo are widespread in Baluchistan and western Sindh. From Mehrgarh Period III (*ca.ca.* 3000 BC.) comes a complete, long and sweeping horn core that is morphologically and metrically similar to those from Santali, in the neighboring region of Gujarat in India. During the Harappan phase, water buffalo appears to have been both hunted and kept as domestic animals in the Kachi

genously or an import.

continent and the west and the swamp buffalo, found from Assam to the Yangtze valley of China in the east. In Pakistan, all strains of belong to river buffalo group. The present day river buffalo is the result of complex domestication processes involving more than one maternal lineage and a significant maternal gene flow from wild populations after the initial domestication events (141).

Satish Kumar et al have shown that the river buffalos were domesticated independent of plain on the border of Baluchistan with Sindh. In contrast, at Harappa in the Punjab, only a very few bovine bones can confidently be identified as coming from water buffalo even though this form is well represented

in the corpus of terra-cotta figurines. Of particular interest is the depiction on terracotta tablets from Harappa Period 3B (2400-2200 BC.) of a water buffalo being speared by a human, indicating that these animals continued to be hunted during the Harappan period. From the Harappan levels at Balakot, near the coast northwest of Karachi, a horncore

specimen comparable to the "swamp" type animal has been found. Bone evidence also comes from Dholavira in Kutch by *ca.* 2500 BC. Here smaller sized animals are present and make up a

substantial proportion of the animal bone assemblage and present kill-off patterns that could indicate management. Water buffalo from Walki on the northern Peninsula from the mid-Second millennium BC have been argued to be domesticated.

Water buffalo pastoralism is different from husbanding other domestic bovids. While caprines and zebu cattle can be pastured in semi-arid areas, water buffalo requires better forage and reliable sources of water for soaking their hides. They are thus likely to have been kept in areas close to permanent water sources. Therefore, it is not surprising that domestic water buffalo were maintained where such a source of water was available. As for why they were being kept, there is so far no direct evidence. However, as with cattle, secondary products
- traction and especially milk - are likely to have been important.

Pastoralism: Pastoralism involves the breeding, raising, and managing of domesticated animals. In other words we may simply call it animal herding. This can be accomplished under many different conditions and does not presuppose any particular degree of economic specialization or mobility or any particular way of life on the part of the pastoralist.

The degree to which individuals or groups depend upon domesticated animals and animal products and the ways in which they husband their stock can vary from time to time, place to place, and circumstance to circumstance. This may involve intensive or extensive management, and in South Asia today (and historically) it is carried out by people with a continuum of lifestyles from completely sedentary to completely mobile, even within the same community. In context of Pakistan, the principal pastoral animals today are domestic cattle *(Bos indicus),* water buffalo *(Bubalus bubalis),* sheep *(Ovis aries),* goat *(Capra hircus),* camel *(Camelus* spp.), horse *(Equus caballus),* donkey *(Equus asinus),* and equid hybrids (mules and hinnies). Although there are some remains in faunal records throughout the prehistoric and protohistoric periods, there is as yet no evidence for pigs having been domestic animals in Pakistan.

Animal herding or pastoralism is very much a part of the food production and this lifeway is of tremendous importance to understanding the dynamics of the early part of the Indus Age. With the emphasis that is placed on the development of the village farming community and sedentism as a human invention, pastoral camps have been just short of ignored. They are important, however, and it is time to redress this imbalance. Fortunately, there is presently considerable interest among archaeologists and anthropologist in studying animal usage over the past nine millennia and in investigating the role that animals played in human societies. This renewed interest is bound to yield results which could rightfully enlarge our present knowledge about pastoralism in Pakistan and elsewhere.

The worldwide literature on pastoralism is extremely uneven and determined by politics and security issues as much as by the need for empirical data. Despite the evident importance of pastoralism in the

development of early agricultural economy in ancient Pakistan and the surrounding areas in the west as well as in the east, very little research work has been undertaken in the past century. It is only recently that researchers have begun the study of pastoralism and that too largely confined to nomadic pastoralism. Available data include published reports on animal bone finds from only a very few archaeological sites, largely from Mehrgarh and other Kachi plain sites in Baluchistan. Some iconographic representations and artifacts recovered from other archaeological sites also help us to know something about how the animals were being exploited. There is almost no direct archaeological evidence for how and where domestic animals were being kept at any given locality, nor about any possible seasonal variability in the exploitation of those animals. For ideas about these matters writers tend to fall back upon "ethnographic analogy" with all its inherent weaknesses, particularly in the absence of any satisfactory archaeological confirmation.

Two kinds of animal rearing emerged in Pakistan and they continue to exist into the present time. One is animal keeping by sedentary people, the other is nomadic pastoralism. Sedentary animal keepers, whether partially engaged in seed agriculture or not, reside at fixed locations or seasonally commute between two or three predetermined locations, generally at the fringes of settled communities but earn their subsistence mainly through animal herding. They make use of the marginal land which cannot be used for agricultural purposes. The pastoral nomads, as the name implies, are the nomadic people whose subsistence depends entirely on domesticated animals. They move around within a specified geographical area in search of fresh pastures and have well-traversed seasonal routes for migration. Such a distinction is, however, fluid. Sedentary pastoralist can become a nomadic pastoralist and nomadic pastoralists can settle down at fixed locations. In historic times we encounter such examples in Baluchistan and on the eastern flanks of the Sulaiman mountain range, some in quite recent times.

As a subsistence strategy, nomadic pastoralism has been common not only in India and Pakistan but also in the whole of Central Asia, including Afghanistan. With their greater mobility, pastoral nomads have frequently found raiding of settled agricultural lands tempting and profitable. And with the constantly increasing population, agriculturists have tended to encroach on any land that could be converted to the growing of crops. This generated periods of organized warfare in ancient history when the nomadic pastoralists periodically invaded the settled agriculturalists, often overpowering them and eventually turning themselves into agriculturists themselves. Quite often these aggressive pastoralists came from outside the boundaries of Pakistan: the ‘invasion’ of the Aryans is a prominent example in the prehistory of Pakistan. The historical period is replete with such incursions.

It is difficult to imagine a purely ‘agriculture’ village or a starkly defined ‘pastoral’ camp. They can only be conceived in terms of a multidimensional continuum. Village farming communities tend to rely more on agriculture and plants, than on mobility and animals. The camp tends to rely on pasture and animals to be mobile or nomadic. But, both forms of settlement and subsistence utilize both domesticated (and undomesticated) plants and animals. Very few traditional farmers in settled villages keep no animals as a part of their subsistence strategy, especially in the Near East, Iran, Central Asia and the Greater Indus Region. Thus, to some degree farmers are themselves involved in animal herding although we may not call them pastoralists. in the neighboring Afghanistan and Central Asia on one hand and Kutch and Rajasthan on the other. This is, therefore, a pertinent subject in the study of the ancient history of this land.

We draw our information from the first known villages (*ca.* seventh millennium BC) through the

emergence of the Harappan Civilization (third millennium BC). The area covered comprises what is today Baluchistan, Sindh, and the Ghaggar-Hakra plain, with occasional forays into neighboring Gujarat, the Divide, and southern Afghanistan. We also make use of the archaeological finds from the Near East for interpretational purposes. We begin with a brief history of the investigation of ancient animal exploitation in the broader region of Middle Asia and



Water buffalo is still a widely herded domesticate in Paki stan, prized for its milk as well as its meat and hide. It is commonly found in Punjab and upper Sindh, less in other areas.



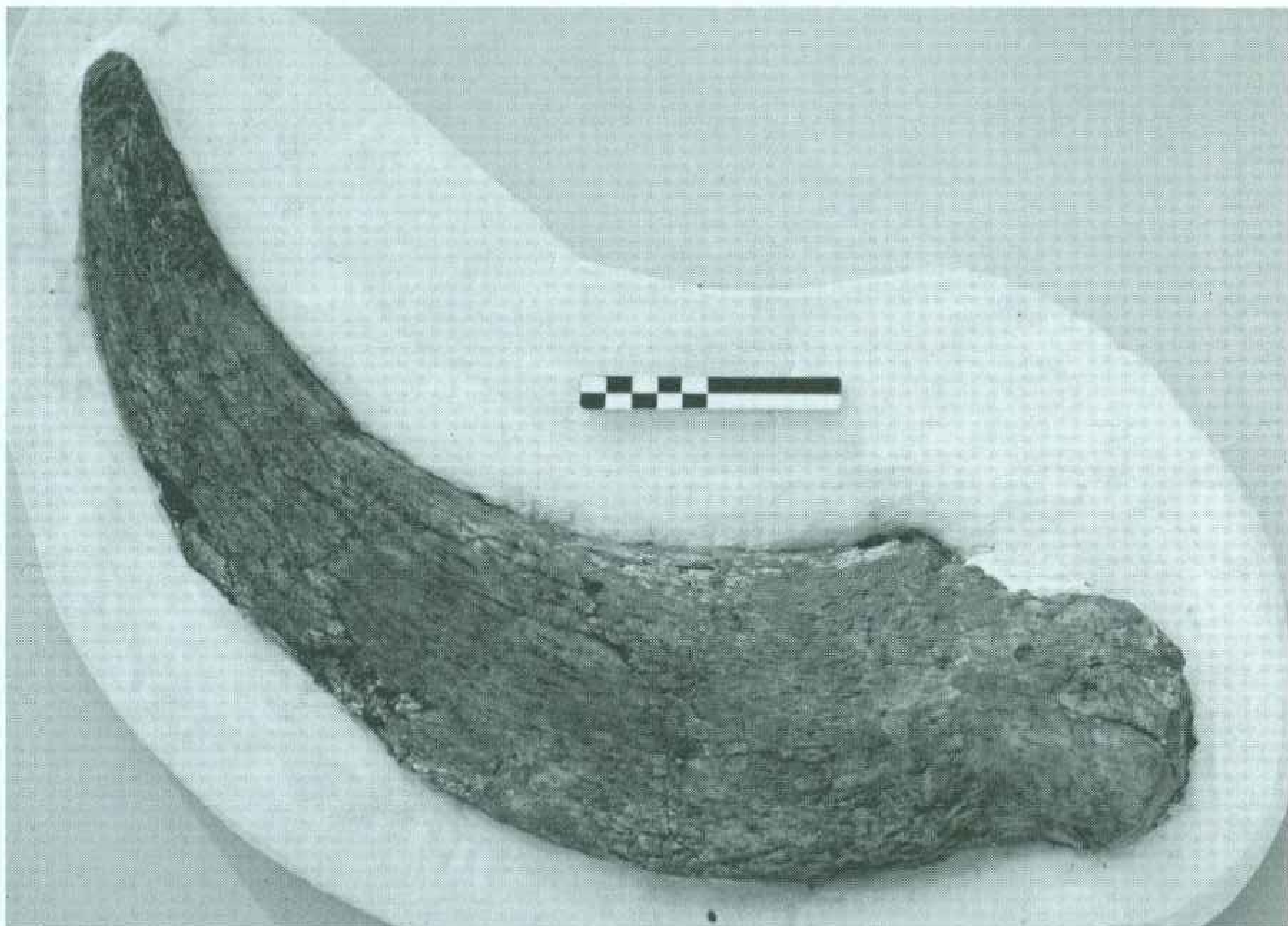


Figure 3.3 Water buffalo horn core from Mehrgarh, MR2, Period III. Photograph by Richard H. Meadow courtesy of the French Archaeological Mission in Pakistan, J.-F. Jarrige, Director.

A majestic specimen of river water buffalo

then review the state of our current understanding of animal keeping and pastoral practices in Neolithic Pakistan, drawing largely from Richard Meadow (6) and Dorian Fuller (71), both of whom have conducted extensive research on this subject. Possehl has also written a lot on this subject, summarizing his thoughts in his *Indus Age - The Beginning*.

Agriculturist-Pastoralists Interaction: Frequently, the two ways of life, pastoralism and agri

Water buffalo horn core from Mehrgarh III *(Richard H. Meadow)*

The same principle applies to the pastoral nomads, most of whom also undertake some agriculture, while at the same time relying to a great degree on their animals for their livelihood.

Contrary to the situation in Europe and the ancient Near East, where pastoralism was generally a minor activity for food production, animal herding by sedentary farmers and nomadic pastoralists has played a significantly important role in the subsis tence regime of the peoples of Iran, Central Asia, Afghanistan, Pakistan, and later on in India. Paki stan's prehistory has especially been shaped by nomadic pastoralists emanating internally as well as



A plano convex molded tablet from Harappa (***ca.*** **2300 BC) showing an individual spearing a water buffalo with one foot prerssing the head down and one arm holding the tip**

of a horn

culture, were compatible, or even mutually interdependent. Whenever the two modes of life existed near one another, a lively trade usually sprang between farmers who had grain, metal, and fabricated objects to exchange, and pastoral nomads, who had hides, wool, meat, and milk products. This


Cattle herding is still a vital agricultural activity throughout Pakistan

number of animals and men could be moved. These migration routes later became the caravan routes and acted as conduits for trade and cultural exchange as well as for the expansion of agriculturists into new lands.

There is great variation in the social relations of pastoral nomads and farmers (120), ranging from outright hostility to a symbiosis between the two. Frequently, the two ways of life, pastoralism and agriculture, were compatible, or even mutually dependent. Whenever the two modes of life existed near one another, a lively trade usually sprang between farmers who had grain, metal, and fabricated objects to exchange, and pastoral nomads, who had hides, wool, meat, and milk products. The village farming communities and pastoral societies have always lived side by side in Pakistan in a symbiotic relationship with each other. In fact, this interaction between the two modes of life is quite prevalent in some areas of the country even today, especially in the foothills of Baluchistan and the erstwhile NWFP, also at the fringes of great desert of Thal (Punjab) and Thar (Sindh). As stated above, till very recent time, the *Pawindas* of Afghani

means that the village farming communities and pastoral societies have always lived side by side in a symbiotic relationship with each other. In fact, this interaction between the two modes of life is quite prevalent in some areas of the country even today, especially in the foothills of Baluchistan, the Pashtun country and at the fringes of the Desert of Thal (between the Jhelum and the Indus rivers in the Punjab), as well as in the Thar (Sindh). The goat and sheepherders still migrate with their stock between the uphill in Baluchistan and the plains of Sindh. The cattle herders regularly travel between Gujarat and Sindh and the *Pawindas* graze their stock over a large area between eastern Afghanistan

and the western borders of Punjab.

Unwittingly, pastoral nomads often helped the agriculturists to expand their territories, which the formers have discovered during the course of their pastoral wanderings. A case in point is the extension of the Indus Civilization into Gujarat in the 3rd and 4th millennium BC. Pastoralists were primarily responsible for figuring out the migration paths through which large



Goat herding in Pir Panjal area of Northern Pakistan

stan regularly undertook seasonal migrations between central Afghanistan, especially the Ghazni area, and the western fringes of the Punjab. Similarly, the goat and sheepherders still migrate with their stock between the uphill in Baluchistan and the plains of Sindh. Even up to a few decades ago, the cattle herders regularly traveled between Gujarat and Sindh and between Rajasthan and southern Punjab.

The prevailing view, particularly in the Near East, is that pastoralism, especially the nomadic pastoralism, emerged within the context of agriculture. There is an agreement among archaeologists that there is no site in the Near East in which the herding of domesticated animals can be shown to have taken place without the population having access to cultivated plants. In fact, the vast majority of pastoralists, whether sedentary or nomadic, undertake some cultivation themselves. By extension, therefore, pastoralism is thought to be an extension of seed agriculture and probably originated concurrently with pastoralism or even before it.

But what of the case in which animal herding might have originated before cultivation? Logically that

is a possibility, the argument being that animal husbandry could have replaced or supplemented hunting in the hunting-gathering cultures while the gathering of vegetable matter could have continued as before. In Southwest Asia, there is the evidence in Zagros area according to which sheepgoat herding is earlier than the development of agriculture. Further evidence to this view comes from South Asia. For instance, bones of domesticated sheep and goats have been found at Gumla, in the Bannu district, mixed with those of the wild animals but there is no sign of any seed agriculture. Similarly, the Mesolithic rock paintings of Chilas, in the extreme north of the country, depict domesticated sheep, goat, mule, and dog, but there is no depiction from which the presence of seed agriculture could be deduced. The same situation is found in Afghanistan where bones of domesticated goat and sheep have been found dating 10,000 BC but no overt sign of agriculture or domesticated plants has been detected. Looking at such archaeological evidence, one is constraint to believe that at least in some parts of the Old World, domestication of animals preceded the domestication of plants, and pastoralism probably developed before the onset of settled agriculture. In balance, the proposition that farming must be developed prior to specialized pastoralism does nor appear to be universal. The culture historical sequence in the Levantine Corridor and Southern Turkey may have worked out this way, but the notion that this is a universal regularity is not supported by ethnographic and historical observations.

Pastoralism Through the Indus Age: The earliest evidence for pastoralism in South Asia comes only from only one site, Mehrgarh, located at the foot of the Bolan Pass in eastern Baluchistan. This site has provided evidence for a transition from an animal economy based primarily on hunting to one based primarily on domesticated animals. The wild animal remains that dominate the early levels of aceramic neolithic Period I (ca. 7,000 BC) reflect this situation with twelve large ungulates represented: wild sheep, and goats from the hills, chinkara from the foothills and plains, onagers and blackbuck from the drier plains, and nilgai, large deer, smaller deer, boar, water buffalo, wild cattle, and possibly elephant from better-watered zones.

Unlike wild cattle that probably existed through much of Pakistan, if not much of South Asia, wild sheep and goats seem to have been confined to the eastern margin of the Iranian Plateau, that is, Afghanistan and Baluchistan. This wild stock of sheep, goat, cattle, and, probably, water buffalo, all comprise potential ancestral stock for the domestic forms. A decrease in body size of the grown or nearly grown animal is one characteristic of early domestic bovids. Richard Meadow has shown that such a process of size diminution was in fact operative at Mehrgarh. To judge from this fact and the occurrence of infant goats as offerings or grave goods in a number of burials at this site, one can draw the conclusion that the process of animal domestication was indeed in progress in the Kachi plains *ca.* 7000 BC. The finds of goats, sheep, and cattle bones in all levels of Mehrgarh are presumed to reflect an introduction of pastoralism in the subsistence economy of this area. But the mechanisms and timing of such a movement remain poorly understood.

Mehrgarh Periods III and IV cover all of the fourth millennium while Amri Period I and Harappa Period 1 date to the second half of that millennium. Each of these sites was supported by a mixed economy based on agriculture and pastoralism. The presence of agriculture has been claimed every now and then in Gujarat and Rajasthan in India in the fourth millennium BC but so far nothing credible has panned out. If the presence of fourth millennium pastoralism were true in northern Gujarat, as is sometimes claimed, it raises the question of agriculture in there (111). To date, however, no fourth millennium sites that have been clearly identified as agricultural in North Gujarat or South Rajasthan, have been recorded.

By the middle of the second millennium, two or possibly three new species had been introduced into the animal economies of Pakistan. These are the camel, the domestic donkey *(Equus asinus),* and the domestic horse *(Equus cabal/us)*. None of these is traditionally used as a food animal, but all are commonly employed for transport and communications. Among the earliest evidence for all three comes from the site of Pirak located in the North Kachi Plain some distance from Mehrgarh (10,143). While faunal remains of donkeys, horses, and camels come primarily from Pirak Period III (first millennium B.C.), figurines of two-humped camels, and horses are present from Period I, probably dating between 1800 and 1500 B.C. (144). In contrast, there are no convincing depictions of either horse or camel in Harappan iconography, and the suggestion of Shaffer (145) that the camel was an animal important for overland trade in the second half of the third millennium does not stand a close scrutiny of the evidence available to date.

In sum, by the end of the fourth millennium the herding of domestic water buffalo, goats, sheep, and especially cattle characterized village agricultural sites throughout Pakistan. In addition, the presence of temporary pastoral encampments has been proposed by a number of scholars. These include sites with sherd scatters and pits in Cholistan (146) and northern Gujarat. Only a few of these have been excavated, however, and the possible keeping of animals by presumed hunter-gatherers remains an open question, as does the relationship such communities may have maintained with their settled neighbors. What also remains to be studied in a comprehensive fashion is what products bestan, Afghanistan, and Baluchistan and thus bequeathed the gift of seed agriculture and animal herding to these areas (59,147). This kind of model was first proposed in line with the Neolithic colonization of Europe. It was proposed at a time when the archaeological evidence for early farmers beyond the Fertile Crescent was thin on the ground and the evidence from the early cultural stage of any 'recipient forager population', such as that at Mehrgarh in Baluchistan, hardly existed at all. The model became an unquestioned dogma because it successfully explained the spread of agriculture to southern Europe.

The data base is still exiguous, but the



The “black tents” of nomadic pastoralists were common in Baluchistan and western Sindh till very recent times. The remnants of them still roam around in the ever decreasing grazing lands with their diminishing flocks of goats and sheep.

sides meat were supplied by domestic stock. The evidence of miniature terra-cotta bullock cart frames (from Harappan sites throughout the region), yokes (from Harappan phase levels at Nausharo), and toy plough suggests that bovinesThe current orthodoxy for the beginnings of farming in Central and Baluchistan has been that the Near Eastern early farmers and animal keepers migrated eastwards from the Zagros across the Iranian plateau to Turkmenimodel no longer fits the ground reality as adequately as it was once thought to do. The division of western Asia into Near East as the “core area” and Iran, Central Asia, and the Indus Valley into “recipient” areas, that lies at the heart of the conventional wisdom, is increasingly coming in question. Doubts are being expressed about the well-established theory that early domestication happened where the progenitors of the current crops and herded animals existed prior to their domestication and opinions are being expressed that there is no *a priori* reason why cereal and sheep/goat husbandry is not at least as old in some other parts of the distribution zone of the wild progenitors as in the better-researched parts of the hilly flanks of the Fertile Crescent. The distinctive nature of the kind of mixed farming (seed agriculture and animal husbandry) that developed in Iran, Central Asia, and Baluchistan contemporarily with farming in South-West Asia (the Near East), together with DNA studies of modern cereals and livestock, imply that this may well have been the case. The conventional wisdom is now loosing its grip no credible

genetic or linguistic evidence has so far been offered.

were harnessed for draft. Whether they were also used for milk is not yet confirmed, nor is the use of sheep for wool. An inter-site comparative study of the remains of sheep and cattle from Harappa and Nausharo, however, does suggest the presence of animals of different sizes and proportions in different environmental zones during the Harappan phase. This may reflect the development of separate breeds in the region by this time.

The Question of Irrigation: We know practically nothing about the origin of irrigation, which played such a large part in Egypt, Mesopotamia, and to some extent in Bolan Valley, Pakistan, in the development of agriculture. We know, however, for certain, as will be evident from the archaeological evidence sited in subsequent pages of this book, that the concept of water conservation and irrigation started within Baluchistan, before the Indus man started to settle along the banks of rivers in the alluvial plains. We also recognize from the evidence elsewhere that irrigation has played a great part in furthering social and political cohesion, since residents of each settlement became dependent on their neighbors. Irrigation is instinctively connected in one's mind with cultivation of land. It deserves notice, however, that irrigation can also be resorted to by people who do not cultivate but collect wildgrowing plants. This was done, for instance, by certain Indians of western North America, and it could have very well practiced by the Indus people of southern Baluchistan, utilizing the water coming down the foot of their cliffs. We may admit, then, that irrigation *could* have been one of the features of the original agricultural complex.

Looking at the early stages of agricultural development in Pakistan, there are some examples of 'primitive' irrigation practices along rivers and water streams, generally small, in Baluchistan which the early agriculturists could have used. Two types of *bunds* were common in the fourth and fifth millennium BC in southern Baluchistan. The purpose of one type was simply to divert some of the water away from the river and to the cultivated fields. The other type was simply constructed by putting some obstruction in the main path of the water. Its purpose was to capture fresh silt from the flow and thus create a new land for cultivation the next year.

This evidence shows that the Indus people knew about the technology of irrigation quite early on and practiced it at appropriate locations. It is, however, difficult to know if the early farmers of Mehrgarh also utilized irrigation for the enhancement of their crop yields. The location of the settlement (on the river banks of the Bolan River and around the marshes created by the Bolan and its minor tributaries in the hilly slopes of the Kachi) indicates to some that irrigation was practiced in the Kachi plains from the very beginnings of agriculture there and the overall evidence in ancient Pakistan seems to favor the idea of the birth of irrigation almost simultaneously with agriculture.

In the plains of Punjab and Sindh, advantage was taken of the inundation that the River Indus and its tributaries brought forth at some degree of regularity year after years. A vast area is covered with a sheet of river water, varying in depth from two to three feet. The waters, on subsiding, left a thick



A primitive and simple method of water diversion for irrigation that is still practiced in Las Bela, southern Baluchistan, and eastern Pakhtunkhwa in Pakistan.

slime, or mud, upon the surface, similar to that left by the Indus in its lower reaches after the great inundation of 2010. Immediately after the inundation is imbibed, the locals sowed the seeds upon the alluvial mud, without any previous preparation whatsoever. This type of *sailabi* agriculture is still undertaken in some areas of Punjab, such as the river banks of the Indus around Bhakkar and Lyeh (district Mianwail). These simple techniques could very well have been used by the Neolithic peoples of the land around the fifth millennium BC.

These practices did not employ major irrigation works, but used for fIelds the margins of back swamps and oxbow lakes, together with periodically inundated areas where floodwater or runoff with its accompanying silts could be trapped using raised earthen or stone walls (*sailaba* agriculture). In addition, small canals and temporary diversion dams could be used to distribute water as needed from lakes, tanks (reservoirs), or even gently flowing channels. In the Indus Valley, major floods usually occur in the summer (July-September) when the monsoon rains add runoff to rivers just beginning to recede from having carried snowmelt from the northern mountains. Thus, a winter *(rabi)* cropping pattern for cereals decreases the possibility of fIelds being flooded by the rivers before harvest. In addition, as noted previously, winter rains in the northwestern part of the subcontinent provide

essential supplemental moisture.

The Northern Neolithic: In outlining the archaeology of early agricultural traditions in ancient Pakistan, prehistorian are generally focused on the eastern slopes of the Iranian Plateau - the area to the west of the Indus. In this region summer monsoon rains are limited or unreliable and much cultivation depends either on the limited regular winter rains or else river waters, which rise in the spring and summer as the limited snow that falls on the mountains melts. Mehrgarh is located in this region. There is a considerably later agriculture tradition from the far north of Pakistan (the Swat Valley and Pothwar), going as far as to Kashmir, which is oftentimes neglected. The beginning of this tradition, like that of the Kachi plain, is also aceramic. Thus, there is a possibility that agriculture began in this region indigenously through borrowing from the agriculture practices, which were slowly spreading throughout the Middle Asia, is more likely. This tradition is generally recognized in archaeological literature by the name of the *Northern Neolithic* and we have described it in some details elsewhere in this book. Here we review it only briefly.

The Northern Neolithic is best represented by sites in the Kashmir valley, although related sites can be identified in Swat and Pothwar also. Here sites occupy the milder valley bottoms and begin to be occupied in the later Fourth Millennium BC in an aceramic phase, known from recent excavations at Kanishpur as well as older work at Gufkral in Kashmir. Ceramic production begins *ca*. 3000 BC and sites appear to be significantly more widespread by the end of the third Millennium BC (59,148,149). The earliest phases are characterized by broad deep pits, with bell-shaped profiles. While these have conventionally been interpreted as pit houses, recent debates have raised the likelihood that they were large storage features (150). Whatever the case, it is clear from these sites that the dominant crops were winter wheat (including freethreshing and emmer), barley, peas and lentils (97) and thus the derives from the Kachi plain tradition. Faunal evidence includes sheep, goat, and cattle, while the status of buffalos and pigs requires confirmation.

On the basis of residential structures and the recovered artifacts, the Northern Neolithic has been associated with a westward dispersal of millet growing Sino-Tibetan speakers (58). On the basis of plant evidence, however, Fuller (74) has disputed this conclusion. In his opinion, the crops and livestock species present are clearly not those of Yangshao China. The presence of Chinese artifacts, like stone harvesting knives in Kashmir remains, must be regarded as a technological diffusion given the subsistence data, and these forms only occur in later Neolithic phases such as Burzahom II and Gufkral 1C (59). These harvesters also appear around this time further south in Baluchistan in the Late Harappan era, as at Pirak (114). It is tempting to suggest that the late arrival of agriculture here was due to an ecological barrier, as cultivation here requires winter tolerant cereals and might therefore be compared to the processes involved in the delay of agricultural spread between Southeast Europe and the central European plains (73).

Conclusion: Our understanding of the origins and spread of agriculture in Neolithic Pakistan has advanced greatly in recent years. In particular, the sites of the North Kachi Plain (Mehrgarh, Nausharo, Sibri, Pirak) have provided a long sequence of plant and animal remains reaching back to nearly the beginnings of agriculture and pastoralism in the region. In addition, many sites from across the vast area of Southwest Asia have been excavated or had material examined in an increasingly detailed and systematic fashion. These data provide us with a basis for the analysis of the data in the Greater Indus Valley and a reference point for our conjectures. Similarly, some relevant data are available from Afghanistan and southern Turkestan with which the peopler of the Indus

Valley have had long-lasting cultural relationships. We now accept that although, rivers, deserts, and mountains were barriers of varying intensity to communication, they did not impede the introduction of new plants, people and animals for long. We also realize that in many ways our knowledge of Pakistan is better than it is for the neighboring areas, with the result that it is diffIcult to investigate the nature of exchange, infIltration, migration or colonization did occur. One related problem is, however, that the first third of the Holocene in the Greater Indus Valley is unknown to us archaeologically and this lets us in the dark about peoples' interactions with local plants and animals during this key formative period.

Because of this gap, hard evidence for the early agriculture in the Greater Indus Valley and the neighboring regions of Afghanistan and Iran, especially from well-dated crop remains, is scarce. Nevertheless, the available evidence for both plants and animals suggests certain patterns that can be used to suggest hypotheses which can be tested and revised through modern, problem-oriented fieldwork. The Greater Indus Valley appears to have been host to a mosaic of processes, including local domestication of plants and animals, the dispersal of pastoral and agro-pastoral peoples between regions, and the adoption of food production by indigenous hunter-gatherers from neighboring cultures.

Our understanding of animal domestication and pastoralism in Pakistan has also advanced considerably since 1947. Beginning in the mid1970s increasing amounts of archaeofaunal material have been recovered from archaeological sites, analyzed, and published, however incompletely. These data indicate that cattle, goats, and sheep, have long been the most important pastoral animal in the region. In arid and semi-arid areas of Baluchistan and Sindh goats were more commonly kept, while in the better watered areas of Punjab sheep greatly outnumbered goats. We also know that water buffalo was domesticated quite early one.

The domestication of plants and animals has long been a bone of contention; some scholars designating Baluchistan merely a receiver of domesticated plants and animals while other invoking an important role of the Kachi plain in the domestication of indigenous plants and animals, especially barley, goats, and zebu cattle. The current orthodoxy for the beginnings of farming in Central and Baluchistan, as generally taught in schools and colleges, has been that the Near Eastern early farmers and animal keepers migrated eastwards from the Zagros across the Iranian plateau to Turkmenistan, Afghanistan, and Baluchistan bequeathing the gift of seed agriculture and animal herding to these areas. This model was first proposed in line with the Neolithic colonization of Europe, at a time when the archaeological evidence for early farmers beyond the Fertile Crescent was thin on the ground and the evidence from the early cultural stage of any 'recipient forager population', such as that at Mehrgarh in Baluchistan, hardly existed at all. The model became an unquestioned dogma because it successfully explained the spread of agriculture to southern Europe.

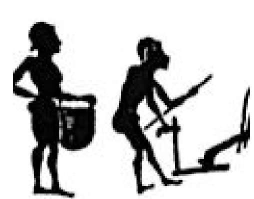
The data base is still exiguous, but the model no longer fits the ground reality as adequately as it was once thought to do. The division of western Asia into Near East as the “core area” and Iran, Central Asia, and the Indus Valley into “recipient” areas, that lies at the heart of the conventional wisdom, is increasingly coming in question. Doubts are being expressed about the well-established theory that early domestication happened where the progenitors of the current crops and herded animals existed prior to their domestication and opinions are being expressed that there is no *a priori* reason why cereal and sheep/goat husbandry is not at least as old in some other parts of the distribution zone of the wild progenitors as in the better-researched parts of the hilly flanks of the Fertile Crescent. The

distinctive nature of the kind of mixed farming (seed agriculture and animal husbandry) that developed in Iran, Central Asia, and Baluchistan contemporarily with farming in South-West Asia (the Near East), together with DNA studies of modern cereals and livestock, imply that this may well have been the case. As a consequence, the conventional wisdom is now loosing its grip and a picture has started to emerge in which Pakistan seems to play a role of a major "nucleus" for the propagation of agriculture and domestication at par with that of the Near East.

As far as India is concerned, we currently have only a patchy archaeological framework with little depth of understanding for any single region, let alone for the entire area. The study of animal remains continues to be rather haphazard and the results are only now beginning to be integrated into the broader archaeological picture. Questions of archaeological provenience and sample integrity are also just beginning to be addressed. While some useful work has been done to elucidate the mutual give-and-take between Pakistan and the west, such a work between Pakistan and India is sorely missing. The greatest need now for those who analyze animal remains in the South Asian context is that they understand the implications of their work for the role of Pakistan in spreading the seed agriculture and animal herding in the peninsular India.

Recent archaeological discoveries in this region have produced sufficient evidence to reconstruct the various stages in the evolution of the food-producing communities on the basis of local developments. The old model of diffusionism from west to east and its consequent effect on the regional developments in Baluchistan and the Indus valley needs to be modified in the light of the new cultural data that have provided very early dates comparable with those found in western Asia.

IV.5. Going Against the Conventional Wisdom - A Case of the Expanded Nuclear Zone



As the material so far described would show, the origins of agriculture have been debated by archaeologists for most of the discipline's history. The topic has been a particular focus of archaeological field and laboratory research from the middle of

the twentieth century onwards. The main course of scholarly debate has been conditioned partly by changing theoretical currents in archaeological thinking and perceptions of present-day or recent foraging and farming societies and partly by the application of improved methodologies. In the regional studies that form a substantial part of this book, we have concentrated primarily on the archaeological evidence left by prehistoric foragers and farmers, in all its richness, from stones to bones to rock art to starch grains, though we have also made reference to the contributions of the several other disciplines that have contributed to the debate, including anthropology, ecology, ethnoarchaeology, genetics, geomorphology, and palynology (pollen analysis). This chapter briefly review the principal themes that have emerged from those studies, as the basis for some concluding reflections on whether it is possible or desirable to continue to subscribe to the conventional wisdom about the origins of agriculture or modify our thinking to accommodate alternative views. So far we

have gobbled up with hook and sinker, although at times somewhat reluctantly, the concept of discrete centers of domestication and the Levantine primacy for the development of agriculture. It is time now to have a critical look on this paradigm and see if other alternatives are available.

There are two opposed views on the development of seed agriculture and animal domestication (5,151). The ‘standard position’, generally taught in schools and colleges, holds that the development of food production and domestication took place in the Near East, especially in the Levantine Corridor, about 8000 or 9000 BC and from there it diffused into Europe as well as across the Iranian Plateau into Central Asia and the Greater Indus Valley. In the discussion so far we have followed this line of thought, albeit with some reservations here and there. Contrasted to this generally well-accepted view is the ‘revisionist position’ which holds that domestication of plants and animals took place indigenously at various places and that the Greater Indus Valley was one of such places. In the foregoing pages we discussed the domestication of goats, zebu cattle, water-buffalo, and possibly barley in terms of their possible autochthonous domestication in the Kachi plains but without explicitly endorsing the position of purely indigenous development. A third option, which has been strongly advocated by Graeme Barker (25) and Gregory Possehl (5), is based on the concept of an expanded nuclear zone, encompassing the vast area between the Mediterranean and the Indus River, and from Zagros mountains to the Kopek Dag.

In this chapter we examine the viability of the third position, i.e. the case of the expanded nuclear zone, outright rejecting the notion of placing the origins of agriculture and animal husbandry in the Lervant from where it spread to Europe as well as to Iran, Baluchistan, Afghanistan, and Central Asia. At the same time, we reject the multi-regional origins of plant and animal domestication, giving rise to indigenous developments in the Greater Indus Valley as well as Central Asia and the Near East. These two extreme positions are replaced by a vast *interconnected* region of “Middle Asia”, spanning from the Mediterranean to the Indus Valley and from the Zagros mountains to southern Turkmenia, that fostered the process of domestication and spread of agriculture through a process of give-andtake between several points in the whole region. Possehl calls this region an ‘expanded core region’.

This chapter overlaps with other chapters of this Section in its geographical scope, as it envisions no clear geographical and environmental boundary between the Levant and Baluchistan or for that matter between southern Turkmenistan and the rest of the region. Western Asiatic land forms - mountain ranges, alluvial valleys, semi-arid steppe, and desert - extend eastwards from the western fringes of the Iranian plateau beyond the Caspian Sea into Turkmenistan in Central Asia, and there are similar environments in Baluchistan as they are in other parts of the region.

The study of these apparently discrete areas as one, single, mutually connected ‘expanded nuclear region‘ is useful in understanding the origins and spread of agriculture in the east of the Near East. It not only provides a theoretical base for the mechanism of the spread of agriculture in the region but also offers a rational context within which the question of the origins of agriculture and animal husbandry could be discussed.

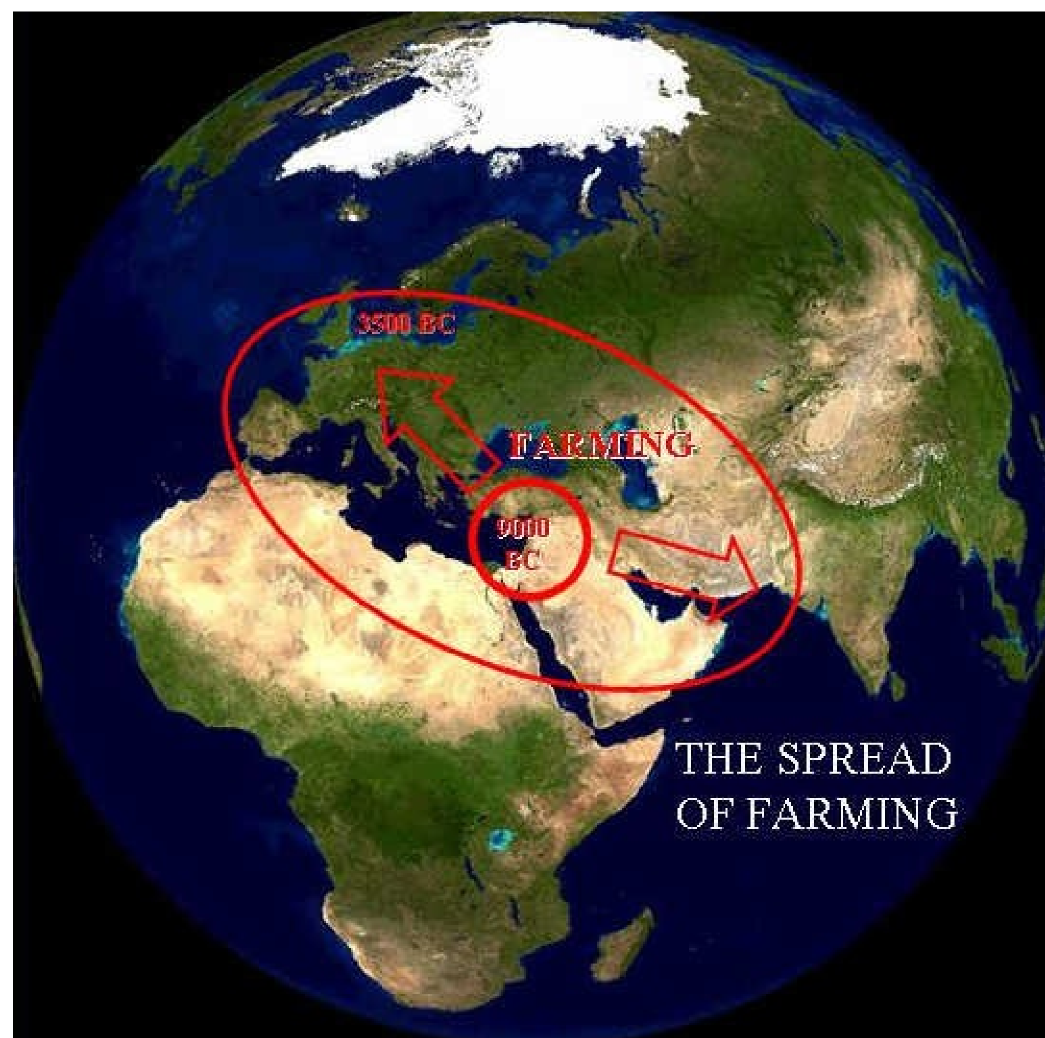
The present discussion is divided into four parts. The first part provides a short background on the theories of cultural change as the conventional paradigm for the spread of agriculture and animal husbandry heavily depends on these basic concepts, and these may not be familiar to the reader. The second part provides a review of the conventional wisdom about the cultural change, especially the

change from foraging to agriculture. This review essentially serves as a summary of the material that has already been covered in the foregoing chapters and points to some of its archaeological discrepancies and theoretical weaknesses.This, naturally, entails some repetition. The third part discusses the geographic, environmental, and cultural interconnectedness of the region of the Near East, Iran, Afghanistan, Central Asia, and the Greater Indus Valley. It provides the necessary foundation for the fourth part, the concept of expanded nuclear zone. This part redirects the discussion on the 'origins' and spread of agriculture from the discrete 'centers' of domestication and cultivation to a network of interconnected 'centers' of domestication and cultivation in a vast area than spans from the Mediterranean to the Indus and from the Zagros to Turkmenia. We begin with the observation that the western borderlands of Pakistan and probably northern Afghanistan and southern Turkmenia have the same suite of potentially domesticable plants and animals that were available in the Near East: sheep, goats, cattle, barley, and possibly wheat. With these resources in place, it is highly likely that the domestication process could have taken place in the region cooperatively, each point contributing some and receiving some in the process.

DIFFUSION AS A MECHANISM OF CULTURAL CHANGE

Much has been written on the the nature and mechanism of cultural change, such as the change from the life of foraging to that of food production. This is a very involved subject that almost borders on philosophy and theory of history. It would be, therefore, pretentious to even attempt a review of this vast subject and untangle the innumerable threads that are woven into the fabric of such a discourse. Nevertheless, something must be said as 'culture', 'cultural change', the 'process of cultural change', the 'forces of cultural change' and the terms like these abound in all the discussions on the spread of agriculture and pastoralism in Eurasia. In this connection, one most frequently heard term is "diffusion". Human societies in prehistory, even those of hunter-gatherers, were rarely isolated from each other and usually engaged in regular contact with their neighbors. By this means, innovations, materials and ideas from one area could spread relatively rapidly into adjacent regions. This process is termed diffusion. The innovations and ideas of one region can diffuse into another area through actual migration of people from one place to another (*demic diffusion*) or it can happen without moving of any substantial number of people from the giver to the receiver (*cultural creep, adaptation, cultural interaction, acculturation,* etc).

Few interpretive constructs have been invoked as often, or as extensively, as diffusion in explaining the cultural change in prehistory. It has probably afflicted the prehistory of Pakistan the most. Practically everything, ranging from the evolution of modern humans in the Upper Paleolithic to the beginning of agriculture and animal herding, the emergence of the Indus Civilization, the spread of Indo-Aryan languages, even the beginning of Hinduism has been assigned either to cultural diffusion or human migration. Diffusion is utilized to explain later cultural phenomena and constitutes the basis of most interpretive constructs of archaeology. In light of this fact, it is surprising that a search of ar

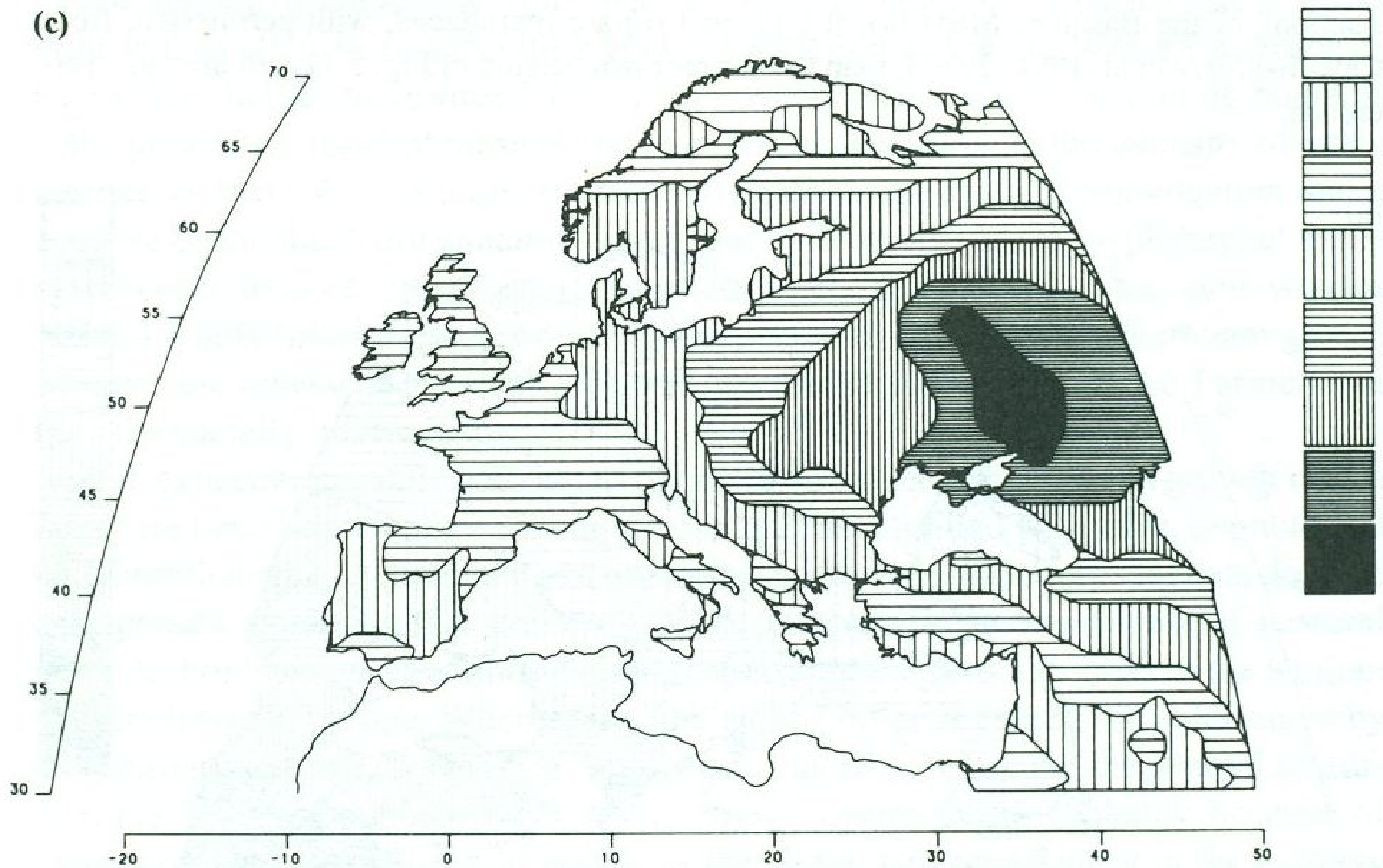


Pictorialization of the conventional wisdom for the origins and spread of agriculture

chaeological literature reveals few explicit theoretical constructions of the concept.

The underlying assumptions for this model of cultural interpretation are based on the preexistence of a "culture center" (in our case, the “core area” of agricultural origin) where, for unspecified reasons, the strength of innovations (in our case, the domestication of plants and animals) exceeds those in surrounding areas. The new culture (in our case, the agriculture, sedentary living, pottery, and the like) spreads out from the center and blends with surrounding cultures until it is dissipated at the fringes, leaving marginal cultures intact. Cultural relationships are viewed as the degree of mutual or unilateral "influence" exerted between culture centers or sub-centers.

Notwithstanding the dominant role that diffusion has played in cultural change within human societies in the past, diffusion has lately come to be regarded with suspicion by archaeologists, owing to its incautious use as an explanation in the earlier 20th century. Many through the impact "lower" ones around them, when a careful reading of the evidence would have shown there was no justification for such a link.The problem with diffusion as a mechanism of change is that it is sometimes difficult for the archaeologist to discount other innovations were explained of "higher" civilizations on



The wave of advance of Neolithic farmers in Europe according to Ammerman and Caravalli-Sfrioza's interpretation in 1971.

possibilities. It is hard to demonstrate beyond question that changes in one area are the result of contacts with another, rather than simply the outcome of indigenous parallel processes.

In his *Prehistoric Baluchistan* (152), Jim Shaffer enumerates several interpretive diffusionary models, some which could be invoked for explaining the spread of agriculture in Pakistan and elsewhere. These models are refinements of two basic types of diffusion: *primary* and *secondary* diffusion. Primary diffusion is the spread of a trait within the original culture area of origin. Secondary diffusion is the spread of a trait beyond the originating culture's boundary. It is the latter type, which has concerned the archaeologists most as they dig out the traces of diffusion of agriculture from the "core" area of the Near East to the Kachi plains of Baluchistan, as an example. In our case, however, the study of the

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Most interpretive statements concerning the spread of the Neolithic culture, especially the spread of agriculture and animal herding or simply the "idea" of agriculture from the West to Baluchistan and later the spread the Neolithic cultures from the Indus Valley to the neighboring areas of India utilized two models of secondary diffusion: *Migration Model* and *Culture Creep Model*. Almost every summary of the Greater Indus Region, including Baluchistan, has invoked one or both of these interpretive models for at least up to the end of Harappan Civilization, if not for the origins of all cultural innovations in the area in protohistoric times.

For the spread of agriculture and animals herding in Europe, the Migration Model (demic diffusion) has been a favorite of many archaeologists and prehistorians. The same logic has generally been applied to the spread of the Neolithic cultures and agriculture in Pakistan. For example, Fairservis (154) attributed the *"raison d'etre"* for various cultural complexes in Neolithic Baluchistan as stemming from the diffusion of early farming complexes from the western Plateau. The source of this original diffusion was attributed to an Ubaid-related Horizon defined by several archaeologists working in that area. Likewise, for Harappan culture, the *"raison d'etre"* was the eastward diffusion of an Early Dynastic-realted Horizon. Consistent with this ap

Europe 327
3000 Be 3500 Be 4000 Be 4500 Be 5000 Be 5500 Be 6000 Be
Fig. 9 **A synthetic map of Europe, showing, according to Refrew,** man and Cavalli-Sforza's interpretation of 14C dates in 1971 (after Barker, 1985: fig. 5)

the expansion of Uralic languages in Europe. Renfrew's initial formulation draws primarily upon the demic diffu

Neolithic settlements in South-West Asia, dates in central Europe and the Mediterranean were of the order of 4500

sion model of Ammerman & Cavalli-Sforza (153) which

Be, and dates from Early Neolithic

implicitly treats agricultural transition as a threshold to

sites on the Atlantic margins of Europe were nearer 3000 Be.
The
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refined by Ammerman and Cavalli-

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sites by then available indicated a 'wave of advance' of Neolithic farmers moving across Europe from the south-east to the north-west at an average

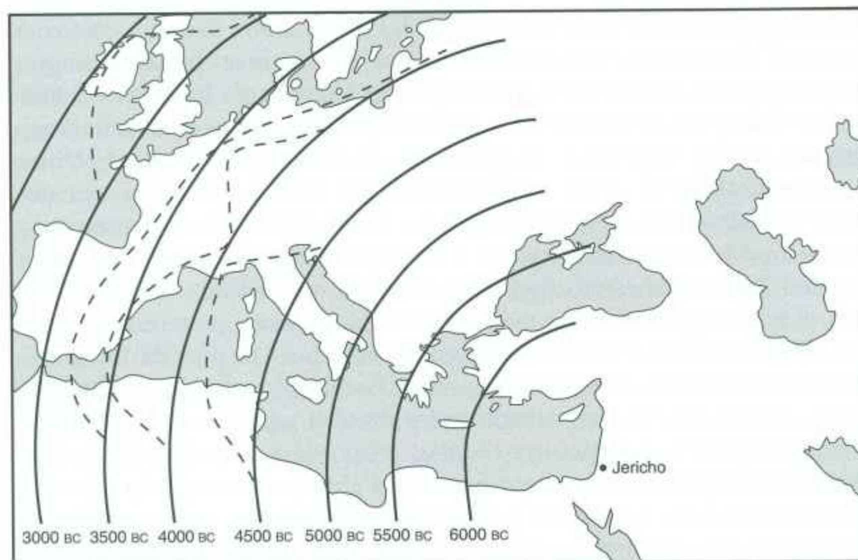


Fig. 9.2. The 'wave of advance' of Neolithic farmers across Europe according to Ammerman and Cavalli-Sforza's interpretation of 14C dates in 1971 (after Barker, 1985: fig. 5)

Neolithic settlements in South-West Asia, dates in central Europe and the Mediterranean were of the order of 4500 BC, and dates from Early Neolithic sites on the Atlantic margins of Europe were nearer 3000 BC.

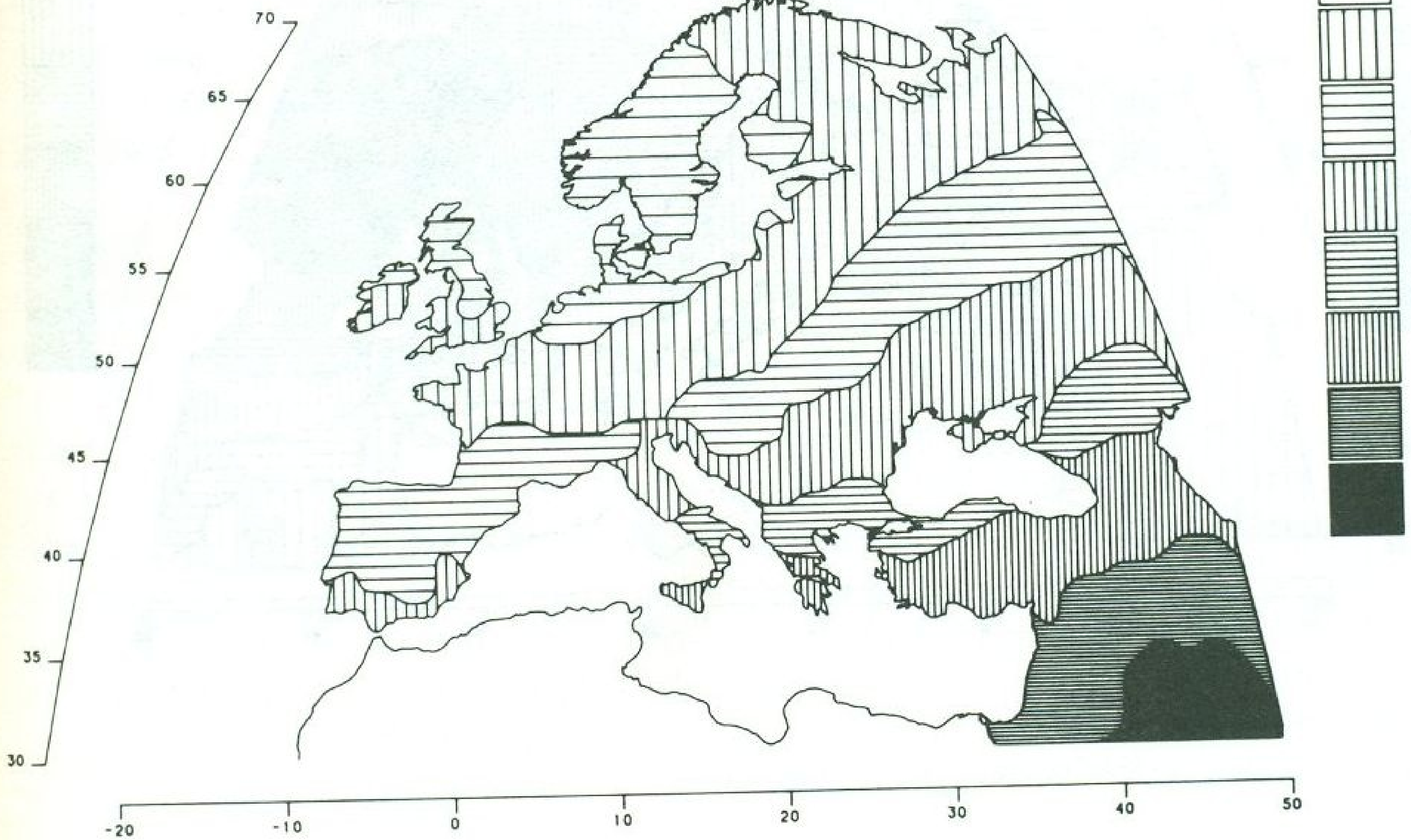
The *ex oriente lux* model was further refined by Ammerman and Cavalli-Sforza in 1971, who calculated that the larger number of dates from Neolithic sites by then available indicated a 'wave of advance' of Neolithic farmers moving across Europe from the south-east to the north-west at an average rate of just over a kilometre a year (Fig. 9.2). A further dimension was added to the model by Renfrew's argument that Neolithic farmers from South-West Asia were the mechanism by which the Indo-European languages (or rather, a proto-language from which the later languages developed) spread into Europe (Renfrew, 1987). As the archaeological record improved, however, it frequently failed to fit the neat predictions of the *ex oriente lux* model. Some Early Neolithic sites had the 'full Neolithic package' of pottery, polished stone tools, and domesticated plants and animals. At others, Neolithic pottery was associated with forager lithic technologies and bones of wild animals, or with mixed technologies and subsistence data suggesting a mix of foraging and farming. There were many regions where the data could be explained more easily in terms of acculturation, whereby European foragers invented farming and/or adopted it through contact with farmers, than in terms of the arrival of

proach was the discussion of Baluchistan presented by Snakalia. In his by Renfrew's argument *Prehistory and Protohistory of* West Asia were the mechanism by which the Indo-European languages (or *India and Pakistan* (155) Baluchistan cultures were spread rather, a proto-language from which the later languages developed) viewed as the result of traits diffused from the West into Europe (Renfrew, 1987). As the archaeological record improved, however, Iranian Plateau. The conclusions reached by these Early Neolithic sites had the 'full Neolithic package' of pottery, polished stone authors implied that the settled way of life was de tools, and domesticated plants and animals. At others, Neolithic pottery was veloped in the Levant and from there diffused to the associated with forager lithic technologies and bones of wild animals, or with rest of the Old World, including Iran, Pakistan and Central Asia. Sometimes, this diffusion of cultures

easily in terms of acculturation, whereby European foragers invented farming was to the spread of an 'idea' rather than the and/ or adopted it through contact with farmers, than in terms of the arrival of

spreading of a particular technological complex but most often it was attributed to the actual migration of peoples from the West.

While the evidence for the spread of agriculture from the Levant to southern Europe through demic diffusion is quite strong, that for Middle Asia, that is, Iran, Baluchistan, Afghanistan, and southern Turkmernia, is only partially so. In assessing whether the early domesticates are more likely to have been introduced to these areas by some seed bearing farmers from West Asia or domesticated locally, Meadow concluded that wheat and goats, and probably barley and sheep, were introduced from Southwest Asia, whereas cattle - especially



Synthetic map of Europe and western Asia, using the first principal components from 95 gene frequencies calculated by Cavalli-Sfroza.Principal Components (PC) are a useful statistical method fog summarizing

geographically patterms in large data collections that easily escape direct inspection. They allowe a 'strtatigraphhioc approach' to genetic data. Each PC is a

weighted mean of all the gene frequencies investigated in all populations, thus generating the first, second, third, ... , PC, the first PC being the most significant the last PC the least significant. The scale of variation of each PC is represented by eight classes; the central values correspond to the mean of each PC and the two extremes or 'poles' correspond to the opposite extreme tendencies of the pattern represented by the PC. When expansions have occurred, as in this case, one of the two

poles usually corresponds to the area of origin of the expansion and the other to the areas where populations show the greatest genetic difference. This synthetic amos shows the genetic gradient from South-West Asia to northern Europe, representing the demic diffusion of South-West farmers northward into Europe.

Bos indicus (zebu or humped cattle), which comprise well over 50 per cent of the faunal assemblage by the second half of the sixth millennium BC at Mehrgarh - may well have been domesticated locally in Baluchistan, possibly more than once. There was the question of goat and sheep domestication since the evidence for domesticate goats and sheep at Mehrgarh and probably in northern Afghanistan is earlier than that anywhere in the Near East. How the West Asian domesticates reached Baluchistan,

Meadow does not speculate. Similarly, how the Indus domesticates, primarily zebu cattle and possibly goat and sheep, reached the Near East, is not discussed.

Archaeological evidence for demic diffusion or a cultural creep between the Near East and the Indus Valley, or, for that matter, between the hilly flanks of the Fertile Crescent and southern Turkmenia, is not robust. Some early agricultural sites have been discovered along the south-eastern margin of the Iranian Plateau from central Baluchistan to Kashmir, but they are attributed to the fifth and fourth millennia and none of which as old as those in the Near East, Mehrgarh in Baluchistan, or Jeitun in Central Asia. All of them, of course, were directly or indirectly, indebted to South-West Asia for the domesticates on which the edifice of agriculture economy was later erected in the Greater Indus Valley.

Genetic studies on the populations of Pakistan have been sparse and these have been partly undertaken to resolve the perennially vexing question of the “Aryans” or sort out the mythical claims of various ethnic groups. These studies hardly resolve the question of any recent incursion of some seedbearing peoples from the West. The genetic studies undertaken in India are numerous but they are equally useless in addressing the question in hand.

A general conclusion drawn from the meager data at our disposal is simple and straightforward and that is: there is no clear genetic evidence for the migration of any seed-bearing Near Eastern or West Iranian farmers who could have brought the art of agriculture and pastoralism to Baluchistan and the Indus Valley. This conclusion also applies to any large scale invasion or migration to the Greater Indus Valley of the so-called Aryans from central Asia. It must be understood, however, that this statement does not negate the possible incursions in and out of the Greater Indus Region of small bands of hunter-gatherers or nomadic pastoralists from the West, the North-West or even the East. These incursions of exotic peoples, must have been of such a small magnitude that they did not leave any recognizable genetic markers in the present-day populations of Baluchistan and Sindh. Indeed, the possibility, or even the strong probability, of such small scale prehistoric migrations is evident from the extension of the frequent invasions and migrations of peoples from central Asia in historic times. Such a possibility, however, does not mean that agriculture and pastoralism was introduced to through some large-scale movement from the West as a result of some population explosion in the Middle East.

In arguing against the notion of agriculture having spread by the large-scale movements of farmers, the last thing we would want to imply is that prehistoric societies, foragers or farmers, were somehow fixed in place. Far from it, in fact the propensity of modern humans to move, at times very rapidly, is another defining aspect of the history of our species. It is quite clear that late Pleistocene and early Holocene foragers were capable of mov

Baluchistan of farmers ing considerable distances fast, including crossing challenging physical barriers, whether colonizing Eurasia from Africa, making sea crossings to Australasia and (as seems increasingly likely) to North America, colonizing most of the Americas with astonishing speed, maintaining contacts over thousand of years between the Japanese islands and the Chinese mainland and between Britain and continental Europe, and making regular visits to the Mediterranean islands from adjacent mainlands. The same propensity to move location must surely have been a characteristic of many other foragerfarmer and farmer societies too. The forager and farmer worlds were equally open to the rapid exchange of information and material goods. Current genetic research,

for example, suggests that some of the millets may have been first domesticated in China and then spread (presumably exchanged from group to group) westwards to reach Europe a couple of thousand years later.

If the distribution of modern wild forms of the cereals and sheep and goats is a general guide to the potential 'hearth(s) of domestication' of the Eurasian farming system, then theoretically the zone of interest of the 'hearth of domestication' should probably stretch from Gibraltar in the west to Kachi plains in Pakistan to the east, and from Cairo in the south to the Crimea in the north.

Graeme Barker, in The Agricultureal Revolution in Prehistory

Given a lack of archaeological evidence and given the lack of any positive sign drawn from genetic studies for a detectable movement of farming people to Baluchistan from the West, the applicability of the demic diffusion model to Pakistan and the neighboring regions seems to be really problematic, even if we bear in mind the propensity of hunter-gatherers of pre-agricultural era to move around and interact with other human groups. A major problem with the demic diffusion model of agricultural dispersal, at least to Baluchistan has been its focus on the transition to farming as some kind of unique sequence of movements in an otherwise static or chaotic world.The complex demographic histories implied by the genetic evidence for each major region of the world suggest the same kind of 'messy complexity' that is detected in the archaeological record whereby foragers became farmers in different ways and at different rates and for different reasons, but often in comparable circumstances of challenges to the world they knew (57).
In arguing against the notion of agriculture having spread by the large-scale movements of farmers, the last thing one would want to imply is that prehistoric societies, foragers or farmers, were somehow fixed in place. Far from it, in fact: the propensity of modern humans to move, at times very rapidly, is another defining aspect of the history of our species (of our 'insatiable curiosity and new-found creativity' in Mithen's phrase). It is quite clear that late Pleistocene and early Holocene foragers were capable of moving considerable distances fast, including crossing challenging physical barriers, whether colonizing Eurasia from Africa, making sea crossings to Australasia and (as seems increasingly likely) to North America, colonizing most of the Americas with astonishing speed, maintaining contacts over thousand of years between the Japanese islands and the Chinese mainland and between Britain and continental Europe, and making regular visits to the Mediterranean islands from adjacent mainlands. The same propensity to move location must surely have been a characteristic of many forager-farmer and farmer societies too. The forager and farmer worlds were equally open to the rapid exchange of information and material goods. Current genetic research, for example, suggests that some of the millets may have been first domesticated in China and then spread (presumably exchanged from group to group) westwards to reach Europe a couple of thousand years later.

For scholars, such as Graeme Barker, a major problem with the demic diffusion model of agriculture has been its focus on the transition to farming as some kind of unique sequence of movements in an otherwise static world. The complex demographic histories implied by the genetic evidence for each major region of the world suggest the same kind of 'messy complexity' that one detects in the archaeological record whereby foragers became farmers in different ways and at different rates and for different reasons, but often in comparable circumstances of challenges to the world they knew.

In summary, the oft quoted relationship between the demic diffusion of agriculture and animal domestication from the Near East to various parts of the Old World seems to be stemming from the clear and well documented migration of the Levant farmers to Europe and the beginning of agriculture there. This does not have any parallel anywhere, especially the area under the present consideration. If there is a west-to-east diffusionary process to be detected, it must be through a process of cultural creep. Archaeological indications are strong that such a mechanism of cultural diffusion in fact did exist but it was most likely a multidirectional diffusion rather than a unidirectional west-east affair.

Chronology of Baluchistan and Diffusionary Models: The sequence of prehistoric remains in Baluchistan and the Indus Valley has progressively been established through the pioneering work of many scholars such as Fairservis and de Cardi, and Shaffer. Excavations conducted later in Afghanistan (Mundigak), eastern Iran (Tepe Yahya and Shahr-i-Sokhta) and at many sites in South Turkmenia have provided comparative material to order more securely a sequence built first on the basis of internal evidence and a few parallels with ceramic industries of western Iran. Meadow integrated such new elements from the various regions of the Indo-Iranian Borderlands to produce a comprehensive chronology (156) which still remains a good guideline. But due to limitations imposed by circumstances to the various projects dealing with Baluchistan, they had mostly the skeleton of a sequence which would not begin much earlier than 4000 BC: the results from the excavations at Mehrgarh came much later.

The factors involved in the regional development of Baluchistan and the Indus Valley were interpreted according to the above-mentioned diffusionary model, which was then a well-established archaeological dogma. The basic idea was that the farther a region was from the nuclear area (the Fertile Crescent), the later it was likely to be affected by currents of cultural and technical change. However, doubts lingered on such a scenario. For example, archaeologists such as Lamberg-Karlovsky and Tosi were able from the results of some excavations to outline patterns of interrelation between various regions of the Indo-Iranian Borderlands, stressing the importance of local developments in the process of urbanization in these very regions (157). Still, on the basis of the archaeological evidence at that time, the sequence of Baluchistan and the Indus Valley was much shorter than was the case in South Turkmenia and eastern Iran, where farming settlements were known to be present as early as the sixth millennium BC. Dates as late as the very end of the fifth millennium BC for Kili Gul Moham mad I, or the first half of the fourth millennium BC for the neolithic assemblage of Sarai Khola in Punjab, still made a sloping chronological horizon from west (now eastern Iran and South Turkmenia) to east a prevalent conception.

It was the excavation at Mehrgarh that added a new and dramatic dimension to the prehistoric sequence of the Greater Indus area. Through the various papers presented by members of the French Mission and published in *South Asian Archaeology* 1975, 1977, 1979, and 1981, one can see how this sequence has been progressively extended with its beginnings pushed back into a much earlier chronological horizon than had at first been expected. The chronological research has been more extensive in the earlier periods of the site (Periods I, II and III). Such periods are still our only source of information for tracing developments antecedent to the better known cultures of the end of the fourth millennium and the third millennium BC in Baluchistan and the Indus Valley.

Jarrige (133,158) in his discussion on the chronology of early Mehrgarh made two points which were also already emphasized in their previous studies.

(a) One can see a progressive widening of the temporal space covered by the excavations of the neolithic levels of Mehrgarh, a situation which dictated a complete reappraisal of the sequence of these regions. Although the radiocarbon dates for the neolithic settlement of Mehrgarh were somewhat erratic, each new campaign of excavation brought elements suggesting an earlier dating.

(b) If a certain degree of synchronism could be established between the first settlement at Mehrgarh and some of the early farming villages of western Iran, we would have to consider if Baluchistan and the Indus Valley, before the Harappan period, should still be interpreted as a sort of cultural backwater, reflecting the influence of more advanced western regions. Another tentative explanation is that a site like Mehrgarh could be a good indicator of the importance of local evolutionary processes in regions where evidence was formerly missing due to uneven information.

The diffusionary model, however, remained intact as, despite several original features, the aceramic neolithic assemblage of Mehrgarh offered too many similarities with several early farming settlements of western Asia not to imply a certain degree of synchronism (133). Several of the parallels Jarring and his team established between the aceramic settlement of Mehrgarh and some early villages of the Zagros piedmont, in a context marked by transition from hunting to herding and plant domestication, could not be the result of mere coincidence; they implied a certain degree of information and interrelation, despite the distances, throughout the vast geographical system between Mesopotamia and the Greater Indus Valley. In that respect , it was believed however that one must not believe that the Kachi Plain was a marginal zone, a sort of refuge area for outdated cultural assemblages. This region, at the foot of neolithic assemblage of Mehrgarh also offered similarities with several early farming settlements of the Bolan Pass, which were part of a large-range communication network well connected with central Asia and the Iranian plateau. Occurrences of sea shells, turquoise and lapis in the aceramic levels of Mehrgarh illustrated well the wide range of connections of this site in an early context.

What we see at Mehrgarh is a sequence of events that seems to document the local domestication of animals. The sheep, goats and cattle start out looking wild, and were manipulated in the way we believe people at the threshold of food production treated their animals. Over time the potential domesticates come to look like domesticated animals (smaller, with the osteological hallmarks of domesticated beasts). They also come to dominate the animals resources used by the early inhabitants of Mehrgarh; something we would expect in the early-mature stage of food production. Thus, the local domestication of sheep, goats and cattle at Mehrgarh is reasonably strong, needing confirmation from other excavations, but a very good story in and of itself.

Utilization of diffusionary models requires that a very close regard to chronology must be paid. It is necessary for chronological data to indicate some sort of time gap between cultural developments in the west and Baluchistan. Generally the length of time interpreted as necessary for such dispersal is quite variable but usually assumed to be extensive, or at least "ample". For example, the amount of time needed (chronological lag) for the dispersal of such traits as the potter's wheel or metallurgy from the west to Baluchistan has usually been considered to be 1500 to 2000 years (59). and the time lag between the beginning of agriculture in Baluchistan and its spread to northern and western India is considered to be about 4,000 years (81).

The data initially forthcoming from Baluchistan supported, rather than contradicted, this persisting point of view. Initial research in Baluchistan failed to identify a well defined Paleolithic or Mesolithic,

the Neolithic suddenly appearing more or less in a vacuum. Initial C-14 dates did little to clarify the situation. The first dates were from the Quetta Valley sequence (97). The implications of these dates were that an aceramic agricultural village complex had been dated to 3500 B.C., whereas a supposedly similar complex in the western Iranian Plateau had been dated to pre-6000 B.C. at Jarmo, producing a time differential of ca. 2500 years. The first erratic and contaminated dates from the Mundigak sequence contributed to the confusing situation. The early periods at Mundigak, which dated ca. 2100 B.C., were compared to those of Hissar IA-C dating ca. 3800-3000 B.C., demonstrating at least a 1000 years difference.

The initial data from Baluchistan, until the excavation of Mehrgarh, established two characteristics very influential in the adoption of diffusionary interpretive models. First, the entire Baluchistan sequence had an intrusive appearance. Secondly, even if the migrational model of diffusion was rejected as unlikely, the initial C-14 dates from Baluchistan were at least 1000 years later than for similar cultural developments in the west. This chronological lag provided the necessary condition of a time differential which could be sufficiently explained by application of one of the many diffusionary modes. The cumulative effect of these factors was not only adoption of diffusionary interpretive models but also the depicting of Baluchistan as somewhat of a cultural backwater, innovating little (if anything), and dependent for its cultural development to arrive via some method of diffusion from the more advanced cultural centers in the western Plateau or Mesopotamia. Considering the state of information, the utilization of diffusionary models for interpretation was understandable.

The situation, however, changed. One of the important results of later excavations has been to question the extent and significance of any such chronological gap between Mesopotamia and the eastern areas of the Iranian Plateau and the Indus Valley (152).

Comparative chronologies for these areas indicate a significant reduction in the time differentials for major cultural developments between the west and these eastern regions. Therefore, one of the basic necessary conditions for the application of diffusionary models may be challenged. A similar conclusion was reached by the recent recalibration of C-14 dates by Renfrew: “The Indus civilization here appears the contemporary, not the successor, of the Sumerian, and was clearly much more than a mere offshoot brought about by Mesopotamian expansion or influence “[quoted by Shaffer in 152).

Meadow stressed that the local domestication of animals took place within the context of fairly advanced cereal agriculture, with domesticated wheat and barley. Similar indications later came from Teijun in southern Turkmenia and tentatively from northern Afghanistan. All this pointed to an interconnected region, a sort of ‘expanded nuclear zone’. We do not know how deep this side of the food producing economy might go in the eastern parts of this ‘expanded nuclear zone’ but notice could be made of the cereal pollen and early burning noted by G. Singh in the lakes of Rajasthan, as early as 7500 B.C. (159) as well as the fact that wild barley has been found in Baluchistan and Afghanistan, all the way to the Himalayas.

A sizable opinion thus started to develop according to which the interpretive, diffusionary models hither to fore employed were thought to be not only unsatisfactory as a mode of explanation, they could not even be satisfactorily articulated with the current data. The cultural developments in Baluchistan were clearly not just pale reflections of ideas which were innovated in Mesopotamia or the Zagros Mountains. Rather, they must be interpreted as essentially *indigenous* phenomena, and their

explanation must be sought within an internal cultural and chronological framework. Alternatively, some other model must be constructed.

The Frontier Theory of Agriculture Expansion - the Case of Demic Diffusion: A useful framework for thinking about the spread of agriculture and pastoralism or the processes of secondary origins is Frontier Theory (161-164). An essential element of the Frontier theory is the existence of a center from which a given culture radiates and the peripheries into which it spreads. Within this framework we can attempt to distinguish two alternative but related processes dominating the establishment of a culture, such as agricultural sedentism, in any region. On the one hand we have moving frontiers when the prominent process is the movement and colonization by agricultural populations (*demic diffusion*) although with at least some recruitment from pre-existing hunter-gatherer populations. This may have been driven in part by the higher population densities and population growth in agricultural societies and could have been allowed by their ability to exploit environments to which agriculture was already adapted. This process need not mean a spread wholesale of archaeological cultures, however, for, as research in the Eastern Mediterraneann indicate, the cultural elements that accompany colonization may be selective (165,166)

Ever since the sepculations of the Victorians about the inexorable progress of Man from the savagery of foraging to agriculture and civilization, Europe has been one of the main theaters of debate about transitions from foraging to farming. The dominant model in the twentieth century, first developed explicitly by Gordon Childe in *The Dawn of European Civilization* (1925) and *The Danube in Prehistory* (1929), has been that of *ex oriente lux*, 'light from the East'. According to this theory, farming began in Europe because it was introduced by Neolithic farmers from South-West Asia, who brought with them domesticated plants and animals together with a new technology that included pottery and polished stone tools. They colonized a land thinly occupied by Mesolithic foragers except at the coastal margins. In southern Europe, the first farmers would have 'taken to their boats and paddled or sailed on the alluring waters of the Mediterranean to the next landfall - and the next'. In temperate Europe, expansion was facilitated by 'slash-andburn' (swidden) agriculture practiced by the first farmers: they arrived at a particular location, cleared the forest, burnt the cut timber, and planted their crops, and then moved on after a few years.

The first suite of 14C dates from European Neolithic sites obtained in the 1960s astonished archaeologists, because the dates of *ca.* 6000 BC from Greek Neolithic settlements such as Nea Nikomedeia and Knossos were 3,000 years older than Childe's suggested date for the beginning of the European Neolithic: ca. 3000 BC. At the same time, the 14C data appeared to confirm Childe's *ex oriente lux* theory, because there was a clear trend of increasingly younger dates with distance from South-West Asia. The dates of *ca*. 6000 BC in south-east Europe were in the same time-frame as dates for PPNB Neolithic settlements in South-West Asia, dates in central Europe and the Mediterranean were of the order of 4500 BC, and dates from Early Neolithic sites on the Atlantic margins of Europe were nearer 3000 BC.

The *ex oriente lux* model was further refined by Ammerman and Cavalli-Sforza in 1971 (169), who calculated that the larger number of dates from Neolithic sites by then available indicated a 'wave of advance' of Neolithic farmers moving across Europe from the south-east to the northwest at an average rate of just over a kilometer a year. Cavalli-Sfroza dealt with this subject again in an article in *The Origins of Agriculture and Pastoralism in Eurasia*, edited by D.R.Harris in 1996. CavilliSfroza later bolstered his conclusion through the ethnographic observations of recent expansions of farmers,

for example the Bantu expansion in central and southern Africa (160). A more direct indication, however, still remained genetic.

Archaeologists have experienced great difficulty in identifying demic diffusion in the material record, and ethnographic data are notoriously subjective. Thus, most of the evidence for dermic diffusion comes from genetic studies. Cavalli-Sfroza spearheaded such studies in Europe and showed that the data exhibited definite genetic gradients in accordance with the hypothesis of demic diffusion. The statistical method of the Principal Component Analysis has helped in consolidating the varied plots of data into single composite maps of many genes and the map of the first PC was shown to be the most important pattern latent in the complex gene geography of Europe. The resemblance between this map and that of the times of first arrival of agriculture, as indicated by radiocarbon dates for the earliest neolithic sites in Europe, was found to be extraordinarily high. This was confirmed by a later analysis using a greater number of genes (167) . Simulations confirmed the potential of PCs to separate different migrations and pinpoint their origins when these were sufficiently distinct geographically (168). Other statistical methods using correlations of the archaeological and the genetic data further confirmed these conclusions (167).

A further dimension was added to the model by Renfrew's argument that Neolithic farmers from South-West Asia were the agents by which the Indo-European languages (or rather, a protolanguage from which the later languages developed) spread into Europe (147). Renfrew's initial formulation draws primarily upon the demic diffusion model of Ammerman & Cavalli-Sforza (169) which implicitly treats agricultural transition as a threshold to unfettered exponential growth in population. He noted that population expansions in a vacuum, as in an uninhabited region, or a near vacuum, as in a region that is not densely inhabited but can be rapidly populated by the new settlers, is likely to be accompanied by the establishment of the language of the settlers. Some linguists had already advanced a similar hypothesis on other grounds (170).

As the archaeological record improved, however, it frequently failed to fit the neat predictions of the *ex oriente lux* model. Some Early Neolithic sites had the 'full Neolithic package' of pottery, polished stone tools, and domesticated plants and animals. At others, Neolithic pottery was associated with forager lithic technologies and bones of wild animals, or with mixed technologies and subsistence data suggesting a mix of foraging and farming. There were many regions where the data could be explained more easily in terms of acculturation, whereby European foragers invented farming and/or adopted it through contact with farmers, than in terms of the arrival of a new people. The archaeological observations at the extreme European periphery of the Neolithic expansion were also of particular concern for some archaeologists. Here, mesolithic cultures could be shown to have survived longer in close proximity to the incoming neolithic cultures. On this basis Zvelebil (171,172).) criticized the demic hypothesis of the spread of farming. Demic diffusion model was also challenged on the basis of linguistics as other possible areas of origin of Indo-European languages were favored among linguists, in particular one suggested by Marija Gimbutas (173). Notwithstanding some reservations for the demic diffusion as a vehicle of agricultural spread, however, the demic diffusion model became well accepted by the early 1980s and attempts were made to apply it to other regions, including Pakistan and India and in the absence of any credible archaeological evidence, genetic studies emerged as the main argument of the debate.

Static Frontier, Interactive Trade, Interaction Zones, and Cultural Creep: The alternative process within the paradigm of center-prepheries may be termed a static frontier, in which stable

agriculturalists interacted with neighboring huntergatherers other neighboring farmers, without involving any significant migration in direction or the other. Such static frontiers would incorporate the "interactive trade" between hunter-gatherers and settled agriculturalists, a process which has been inferred between several regions of the Old World for the spreads of respective cultures or technologies. Such a process of cultural change is often called 'cultural diffusion'. For the purpose of this discussion, we may consider here, as an example, the cultural interaction of the Indus Valley with Gujarat and Rajasthan (174-178)

in the third millennium BC. During this process some hunter-gatherers gradually taken up aspects of the Neolithic, such as agricultural. Social interactions were doubtless also important such as inter-marriage, and new cultural traditions could have developed. Although much more sophisticated in its details, the process of static frontier for cultural change is very much akin to the process of adoption through interaction zones since there is no requirement for the migration of agricultural people to the areas of huntress and gatherers.

Culture creep is another name for the same or similar phenomenon. It is generally defined as the chance recombination of influences and elements drawn from neighboring areas to re-form a unit complex that entails features of both. A common tradition is thus born. Elements diffused are subjected to the channeling constraints of geographical and ecological factors. Cultural creep is the most common alternative model of demic diffusion and Childe used it in elucidation of European prehistory and it is not surprising that some other scholars used the same model of explanation for other areas. This factor was very obvious in Childe's discussions of distributions for the potter's wheel and metallurgy.

Piggott (179) also subscribed to this mode of interpretation, not only for Baluchistan but for the entire South Asian scene. The general thrust of such a process, however, remained west-to-east. Although referring to occasional direct movements into the area by peoples, his general conclusion was: "So far as India is concerned, therefore, we must look westwards for the introduction of the arts of agriculture, and it will be seen throughout this book how the Indian material can be properly understood only in terms of its general Western Asiatic setting (173). Allchin and Allchin's (59) summary work represents a direct continuation of this mixing of invasion and culture creep models. Allchin and Allchin (59), although usually invoking immigrations as an explanation, also denote the possibility that changes may have resulted from arrival of mere "new influences" from the West through cultural creep or cultural diffusion.

How agriculture spread without much migration (that is, without demic diffusion) is in part a discussion of how agricultural communities impacted the much wider territories of hunter-gatherer communities. Direct diffusion of culture occurs when two distinct cultures are very close together. Over time, direct contact between the two leads to an intermingling of the cultures. Historically this occurred through trade, intermarriage, and sometimes warfare because members of the various cultures interacted with each other for long periods. What the neighbors do can have a profound effect on what one's community does. The sedentism of one group could impact a neighbor's activities. Similarly, the nature of existing hunter-gatherer communities would impact the possibility of change and the likelihood of adoption of new methods. Hunter-gatherer societies did not adopt farming indiscriminately, but selectively, to fit the local needs. These needs varied from region to region, and so did the factors which combined to bring about the shift to food production. It follows, therefore, that there is no single cause for the transition which would fit all situations.

Conclusion: The spread of domesticated plants and animals from the Near East to mainland Iran, Central Asia, and the Greater Indus Valley is not wholly without merit. A lot of research has gone into this paradigm and all of it did not stem from the 'Euro-centric bent of mind'. There is no alternative model that also does not suffer from the same shortcomings as the one we designate as the 'conventional wisdom'. There are lot of facts in this convention and these cannot just be thrown out of hand just for nationalistic or other reasons. All this necessitates an open mind. While we should not consider the conventional wisdom as our dogma, we should not be entirely averse to this model. The spread of agriculture and pastoralism should not be pegged to the question of the 'origins' alone, it is primarily an issue of the spread of the Neolithic cultures within Baluchistan and Sindh as well as the spread of the staple crops to the far reaches of the region.

THE CONVENTIONAL WISDOM

Since the Second World War, study of the origins and early development of agriculture on a world scale has been dominated by the concept of primary or "nuclear" centers where it has been assumed hunter-gatherers initiated crop cultivation and animal breeding and from where agriculture and pastoralism later spread to secondary or "noncenters: the Near East, or the South-West Asia in general, has been the focus of particular attention as a "core" or "nuclear" region and the areas like Baluchistan, northern Afghanistan, and southern Turkmenia as the "secondary" or "recipient" regions.

This textbook orthodoxy seems to propose that the plant and animal domestication took place in Southwest Asia, especially in the Levant (42) very early on in the Holocene, *ca.* 8500 BC. and that it underpinned the dramatic development of agriculture and animal herding as evidenced by PPNB villages in and around the 'hilly flanks of the Fertile Crescent'. From the 'Levant Corridor' the PPNB farmers migrated westward to Europe; from the slopes of the Zagros mountains across the Iranian Plateau eastwards to the Indus Valley; and from across the Caspian Sea eastward to Turkmenistan and northern Afghanistan, bequeathing the gift of agriculture and domesticated animals to these areas. Thus, agriculture and animal herding spread in the vast expanse of Eurasia.

......even on straight uncalibrated dates, farming, pottery and metallurgy are now seen to have appeared in Baluchistan and central Asia so much earlier than had previously been assumed and that these areas could no longer be seen as hopelessly retarded in cultural development in comparison with south-west Asia. *Graeme Barker, in The Agricultural Revolution in Prehistory*

According to this view, cereal agriculture based on wheat, barley and pulses, and pastoralism based on the raising of goats, sheep and cattle, were established in Baluchistan-Sindh border, in the relatively well-watered piedmont zone along the eastern margin of the Iranian Plateau by the seventh or even eighth millennium BC. Similarly, this 'Near Eastern' cultural package reached southern Turkmenistan by the sixth millennium BC. The site of Mehrgarh in the Kachi plains in Pakistan provided the earliest evidence of agro-pastoral settlement in South Asia, dating to about the beginning of the seventh millennium BC, which is some one thousand years after the date generally quoted for the origins of agriculture in the 'cradle of civilization'. The evidence from southern Turkmenia comes from a set of sites that are collectively referred to as the Jeitun Culture. Here seed agriculture or domesticated animals took some two thousand years to reach and get establish.

The chronology of these sites, as sketchy as it is at this time, confirms this scenario because the dates become younger and younger as one moves from the Mediterranean to the Indus Valley or from Ali

Kosh in South-West Iran to Jeitun in southern Turkemenia. This conclusion is also seen by some as lending support to Renfrew's hypotheses concerning the origins of the proto-Dravidian and proto-Altaic languages, which propose that the former spread across southern Iran from the southern Zagros region to South Asia in association with agriculture, and that the latter originated in Turkmenia and gave rise, in association with pastoral nomadism, to the Early Altaic languages of Central Asia. Alternatively, the seed-bearing farmers of Anatolia brought the Indo-Iranian languages to the Indus Valley.

In context with Pakistan, Baluchistan has been viewed not as an area of indigenous cultures but as the region where these cultures developed as a result of eastward diffusion of the West-Asian cultures, probably brought about by the actual movement of farmers from West to East. McCown (180), Piggott (179), Wheeler (181), Allchins (59), Fairservis (154), Sankalia (155), not to speak of Gordon (181) and Subbarao (113) all perpetuated this viewpoint. Some of them went a step further and treated Baluchistan as a corridor through which western cultures seeped through to the Indus Plain and further on to India. As far as Iran and Central Asia were concerned, there were no firm dates for any evidence of agriculturere or domesticated animals between the ‘hilly flanks’ of the Zagros mountains and the Kachi plains or between the hilly slopes of the Levant and the Jeitun settlements in Turkestan.

The arid geophysical character of Baluchistan is often given an impediment to an independent domestication of plants and animals, autochthonously or under the influence of the West. This is not withstanding the fact that a similar ecology exists in and around the ‘nuclear’ areas in the Near East and that Baluchistan’s landscape is dotted with a number of rivers and other sources of water resulting in no apparent dearth of water or good soil. Certainly, Baluchistan hilly slopes are no different from the ‘hilly flanks‘ of the Zogros in the Near East where agriculture is supposed to have thrived after its ‘origin’ in the Levant.

This model has its origin in the treatment of the origins of civilization in Europe by Gordon Childe whose writings have cast a long shadow on all subsequent research in the origin and spread of agriculture since then more than 70 years ago. Assuming the model of an archaeological culture, wherein South-West Asia played a crucial role, Childe wrote powerful historical narratives throughout his career, and continued until his death to produce revised editions of his most influential books.

Subsequent to the ground-breaking writing of Childe a number of authors have played on this theme and provided us with a picture the essential kernel of which is the preeminence of the Near East not only in the origin and spread of agriculture but the very source of the world civilization. Among them the contribution by Ofer Bar-Yosef and Richard Meadow particularly stands out. In an oft-quoted paper, published in 1995 in a multi-author book (42), they depicted a particularly rich account of the transition from foraging to farming in the Near East where agriculture and animal husbandry was initiated and from where it radiated outward throughout Eurasia. The scope and breadth of the Bar-Yosef and Meadow article likely explains why it has been the most authoritative and most widely cited synthesis of Near Eastern agricultural origins and its subsequent spread all over Eurasia. For a long time, this work served as an ideal benchmark against which to measure advances in our understanding of Near Eastern plant and animal domestication and the emergence of agricultural.

Whilecomprehensiveinitsgeographic scope, Bar-Yosef and Meadow (42) had a special emphasis on the Levant, especially on the southern Levant. Decades of survey and excavation, especially in the

parts of the Levant that fell within the borders of modern Israel, had yielded a remarkably detailed and well-controlled archaeological record of the transition from foraging to farming in this part of the Near East. Similar coverage had not yet been accomplished in other parts of the Fertile Crescent or anywhere else. When Meadow article was published, documenting domestication in plants and animals required the detection of morphological modifications caused by domestication. In cereals, the marker of choice was the development of a tough rachis, a change in the plant's dispersal mechanism thought to a r i s e w h e n h u m a n s sowed harvested cereal grains. In pulses, the primary domestication marker was an increase in seed size, a response to seedbed pressures that allowed sown seeds to germinate more quickly and shade out competing seedlings. In animals, archaeozoologists relied primarily on the demonstration of overall body-size reduction, held to be a rapid response to herd management.

Based on these criteria, crop domestication was thought to have originated in the southern Levant during the Pre-Pottery Neolithic A (PPNA) period, around 11,500–11,000 years ago. Animal domestication seemed to have been a delayed development, with different livestock species brought under domestication in different parts of the region (from the Levant to the Zagros), beginning with goats sometime during the Middle Pre-Pottery Neolithic B (PPNB), around 10,000 years ago, followed by sheep, with cattle and pigs domesticated later still. While livestock and some crop plants may have been domesticated in other parts of the Fertile Crescent, the southern Levant was thought to be the home of initial cultivation from which domesticates and domestic technology spread quickly into the rest of the Fertile Crescent through an "un-even the Bar-Yosef and

I nstead of the core-periphery model, we consider here the evidence for the movements of resources over long distances, linking very different kinds of farming and foraging societies throughout the region that spans from the Mediterranean to the Indus and from Fars to Turkmenia. Whatever the intermediaries, the farmers of this vast region may have acquired some of their cereal crops, millets and pulses through variously constructed cultural exchange relationships with the neighboring regions while propagating their own inventions and acquisitions to the farmers and foragers of these lands in return. In effect, this vast geographical area can be considered as an 'expanded' core area of the conventional model. (Gregory L. Possehl**)**

series of movements affecting different areas at different times" (42). The coalescence of disparate elements of this subsistence system into an agricultural economy was thought to have occurred over a 2,000-year period, from about 10,000 to 8000 years ago, during which time it gradually became the dominant subsistence economy throughout the region.

In The 20 years since publication of BarYosef and Meadow (42), there has been an exponential increase in information on this transition not only from the southern Levant but also from other parts of the Fertile Crescent and some parts of Middle Asia that had not been as thoroughly explored in 1995. A number of new archaeobiological approaches to documenting domestication have been developed that are providing powerful new insights into the initial phases of domestication in both plants and animals. Also contributing to the emerging picture of Near Eastern agricultural origins are genetic analyses that have identified the progenitors

of Near Eastern domestic crops and livestock species and defined the likely geographic regions of their domestication. More widespread use of smallsample accelerator mass spectrometry (AMS)

radiocarbon dating has made it possible to directly and precisely date the remains of domestic plants and animals, greatly enhancing the temporal control of our understanding of this transition. The result is a vastly changed picture of the origins of agriculture

in the Near East.
The recent discovery of
PPNA monumental complex at
south-eastern Turkey emphasizes the fact that very
large areas of South-West Asia still remain underresearched (or even, for all practical purposes, unresearched) in terms of targeted field-work to a
modern standard, as a result of decades of political
instabilities and tensions. This applies both to where
archaeological surveys and excavations have not
taken place, and where botanical and zoological
fieldwork has not been undertaken with the aim of
modeling the likely distributions of wild cereals,
sheep, and goats (including now from the DNA patterns in modern landrace species). If the distribution
of modern wild forms of the cereals and sheep and
goats is a general guide to the potential 'hearths of
domestication' of the Eurasian farming system, then
theoretically the zone of interest of the 'Near Eastern hearth of domestication' should probably stretch from Gibraltar in the west to Kachi plains in Pakistan to the east, and from Cairo in the south to the extraordinary Gobekli Tepe in Turkmenia in the north. That various species of wild wheat, barley, and legumes were being gathered throughout the Mediterranean in the early Holocene is a timely reminder of the dangers of decades of research focused in one or two small parts of that huge area proving to be self-fulfilling prophecies about their unique status as 'the primary hearth of domestication' of a particular type of plant or animal
(25).
The second objection we should make to the
orthodox theory is that the archaeological data from
Israel, Jordan, Syria, and Turkey make it quite clear
that we are studying a very long-lived process or
processes, not a 'PPNA or PPNB event'. Practices
that can be identified as having many characteristics of animal and/or plant husbandry were being undertaken by the Natufians several thousands of
years before the PPNA. However, we can also see
that Natufian behavior was profoundly affected by
the dramatic climatic and resultant ecological
changes after the Last Glacial Maximum. The sudden return to the markedly cold and arid conditions of the Younger Dryas in particular changed the distributions, densities, and seasonal availability of key
plants and animals. Herds of gazelle, for example, a
species well suited to the return to arid conditions,
expanded their range, whereas the wheats and barleys contracted into better-watered refugia. People had to respond to the profound changes brought
about to the landscapes in which they lived by the

Pleistocene-Holocene transition, and clearly did so. The last point introduces another important observation of general applicability for any general theory about the agricultural revolution in prehistory: that people then as now had choices and took decisions in historically contingent circumstances. The population of South-West Asia responded to the threats and opportunities of profound landscape change in the millennia on either side of the Pleistocene-Holocene boundary in different ways. Some maintained existing modes of subsistence by moving to new areas; others diversified; and still others intensified in ways that were to develop into what in time becomes recognizable to us as the Eurasian system of mixed farming. Developing a reliance on domesticated cereals, in particular, can be understood as an irrevocable step, because the demands of time and labor involved in ground preparation, planting, weeding, protection from predators, and harvesting were, cumulatively, more or less all-year-round and were not easily compatible with mobile foraging.

Although scholars disagree about whether changes in ideology in South-West Asia came before or after changes in subsistence, or whether both developed in tandem in a 'positive feedback' relationship, the debate very usefully underlines another observation of general applicability to this inquiry: that the transition from foraging to farming was as much a social and psychological as an economic and technological process. To change from foraging to farming ultimately involved profound transformations in ways of *thinking* and *being* as well as *doing*. 'As a "privatization" of resources it marked the end of the forager sharing ethic, and as a commitment to a more permanent corporation it created new roles both for the living and the dead' (25).

Coming to Central and South Asia, the current orthodoxy has been that Indo-European PPNB farmers migrated eastwards from the Zagros across the Iranian plateau to Turkmenistan, Afghanistan, and Pakistan, and Dravidian rice farmers from East Asia migrated westwards to the Ganga (Ganges) valley. This kind of model was first proposed, like the Neolithic colonization of Europe, at a time when the archaeological evidence for early farmers was thin on the ground and that of the 'recipient forager population' hardly existed at all. The data base is still exiguous, but certainly no longer fits theories of agriculture beginning in Central and South Asia as a result of Indo-European and Dravidian migrations.

“Many of us [have] become increasingly concerned over the past several years in the realization that the recent unexpected and exciting findings of Near Eastern Neolithic research cannot be interpreted and explained adequately within the explanatory frameworks generated in the past

few decades.”
Hans George Gebel et al in their call for participants in the workshop entitled ‘Towards New Frameworks’, 2004, quoted by Trevor Watkins (185)

As mentioned earlier, there is not *a priori* reason why cereal and sheep/goat husbandry is not at least as old in this part of the distribution zone of the wild progenitors as in the better-researched parts of the hilly flanks of the Fertile Crescent. The distinctive nature of the kind of mixed farming that developed contemporary with PPNB farming to the west (which included durum wheat, date, and cotton), together with DNA studies of modern cereals and livestock, imply that this may well have been the case (25). In the Ganga valley, foragers were harvesting wild rice very early in the Holocene, and by the time farming villages had developed to the west like Jeitun and Mehrgahr, the rich food resources of the Ganga valley sustained complex (semisedentary?) foraging societies who may have been practicing rice horticulture long before any putative Dravidian migration of rice farmers from East Asia. The recent realization that rice farming almost certainly began independently in the Ganga valley poses many questions about the environmental and social contexts in which it happened that have hardly been asked by scholars, let alone addressed with new fieldwork. The same is true of the gathering evidence that several indigenous millets and pulses were probably domesticated in central and southern India in a process independent of Harappan agriculture.

Another finding of general significance to wider models of foraging-farming transitions is the evidence for the movements of resources over huge distances, linking very different kinds of farming and foraging societies. Whatever the intermediaries, Indus Valley farmers may have acquired some of their millets and pulses through trade variously with Oman (1,250 kilometres away), Mesopotamia (2,500 kilometres), East Africa (3,000 kilometres), and rice from the forager-farmers of the Ganga valley (1,000 kilometres). Or, conversely, the Mesopotamian and Indian farmers may have acquired the domesticated cow (Bos *indicus*) and the water buffalo from the Indus Valley at several hundred kilometers distance.

Finally, the hugely improved database of welldated sites with well-studied subsistence data makes it quite clear that the beginnings of millet/ cattle farming systems in central and southern India were characterized not by the steady 'wave of advance' predicted by colonist migration models but rather by 'punctuated explosive dispersal'. Grsaeme Barker has argued (25) that the dominant process was the acquisition of domesticates by indigenous foragers, at different rates and in different ways, and in the initial phases of use perhaps more for their value as status items than as food staples.

In view of new archaeological finds at many neolithic sites across the whole region of Iran, Central Asia, and Baluchistan, many of the archaeologists and archeobiologists have become increasingly concerned over the past several years in the realization that these cannot be interpreted and explained adequately within the explanatory frameworks generated in the past few decades, the frameworks which seek to locate the origins of the Neolithic in general and the domestication of plants and animals in particular in the ‘core area‘ of the Near East from where it spread to Europe as well as to the rest of Asia. According to this framework, Central Asia and the Indus Valley have traditionally been treated on the receiving end of the basic Neolithic traits, especially the art of agriculture and animal herding, from the ‘core area‘ of the Near East where plants and animal domestication is first supposed to have originated.

Archaeological theory has also come a long way since Childe’s death more than half a century ago;

the theoretical flaws and the practical failures of Childe's culture-history mode have been thoroughly documented and thoroughly documented (182,183,184). However, prehistoric archaeologists working in Southwest Asia have not yet developed a replacement mode for the making of prehistoric narratives (185). We find that writers of syntheses either continue to use the Childean culture-history narrative, or experiment with their own versions, misuse the term 'assemblage' in order to avoid the word 'culture', or revert to chipped stone technology as the defining characteristic for mapping distributions. None of these is satisfactory, but they have served because most syntheses have focused on a supposed core area in the Levant (185).

The 'Levantine Primacy Model' was proposed at a time when the archaeological evidence for early farmers was thin on the ground and that of the 'recipient forager population' hardly existed at all. The data base is still exiguous but in recent years, this view has changed somewhat although the origins of agriculture still remains firmly anchored in the Near East from where it spread to Baluchistan and further on, although belatedly, to the rest of the subcontinent (186). The only perceptible change under the impact of various discoveries in the archaeology of southern Central Asia is in the routes of cultural diffusion.

The fundamental question of how far this core-periphery model of agricultural origins fits the data now available for Eurasia as a whole has been addressed, implicitly or explicitly, by some scholars in recent times and these disincentive views have been referred to here and there without any notable focus on alternative explanations. The hypothesis of the Levant Primacy in the origins of agriculture is still being accepted as a starting point in any discussion on the origins and spread of agriculture in Eurasia, including Pakistan. The widely-held view of holding the demic diffusion for the spread of agriculture to Europe, Central Asia and the Indus Valley has also been given considerable weight, although not accepting it as a dogma.

For example, Dorian Q. Fuller, who has done quite extensive work in Pakistan and India, inequitably states (71):

"As yet there is no site in Baluchistan that provides the transitional stages that must have preceded the establishment of Mehrgarh, but the clear antiquity of agriculture based on the same crops in the Near East suggests that when found this transition will include the introduction of crop already domesticated elsewhere. While the evidence from Mehrgarh for locally domesticated animals in quite strong [discussed below], claims for locally domesticated cereals are unsubstantiated". Similarly, Zohary, an unquestioned authority on domestication of plants and animals on the wold scale, designates the northern Levant and southern Turkey as the original home of all winter crops that are now the staple of a vast area of Asia and Europe, emphatically stating:

"Wild wheats, for example, have a much more limited known distribution today, in the northern Levant and southern Turkey, which argues against a domestication of these cereals in South Asia, unless we assume a massive level of vegetation rearrangements between Iran and India during the Holocene. For the beginnings of plant cultivation based on Eurasian winter cereals, current evidence favors a restricted nuclear zone, within which there were probably a few local centers of domestication. Within this Near Eastern zone wild wheats and barley form extensive stands, the likes of which are not known from South Asia, even for wild barley. Furthermore, the Southwestern Asian zone of domestications included a wide range of winter pulses and flax as companion crops for the wheats, barley and rye." (21).

Similarly, David R. Harris, a well-recognized authority on the subject states:
"Vast gaps remain in our knowledge of early agriculture and pastoralism in Eurasia, but this provisional synthesis of much of what we do know suggests - to me at least that we are observing a more unified phenomenon than is often supposed. What does *not* emerge from the evidence we have is a picture of multiple independent foci of agricultural beginnings at diverse times and places. On the contrary, the evidence best fits a model of very few - possibly only two - independent "centers" in which pristine transitions to agriculture, in the sense of dependence on the systematic cultivation of (mainly) domesticated crop plants, took place" (57).
"The most parsimonious interpretation of the available evidence suggests, first, that seedcrop agriculture based on cereals and pulses developed in western Southwest Asia during the eighth millennium BC, associated in the seventh millennium with the raising of domesticated goats and sheep, and, secondly, that seed-crop agriculture based on millets and rice, with domestic pigs and chicken, developed in East Asia, probably first in the basins of the Huanghe and Yangzi rivers, by, or possibly before, the mid-seventh millennium BC (whether separately in these two parts of China or as part of a single developmental process there we do not at present know)" (57).
Zeder has recently (2011) critiqued Bar-Yosef in her review article *The Origins of Agriculture in the Near East*, published in the *Current Anthology* (187). The emerging picture of plant and animal domestication and agricultural origins in the Near East is dramatically different from that drawn 20 years ago in the landmark Bar-Yosef and Meadow (42) article. But surprisingly the central theme remains the same; even at this late date she ends up strengthening the Childean narrative than to upset the apple cart.
We ourselves have faithfully followed this theoretical framework within this Section and in the previous ones, indeed throughout the book. This model is convenient, because it limits the significant area of South-West Asia to one that can be argued to be a single cultural unit within a zone of some environmental coherence. Thus, innovations adopted within the Mediterranean corridor are the property of a single cultural group, usually termed successively Natufian, PPNA and PPNB, and the spread of farming becomes the spread of the PPNB culture or its influence on other, marginal and poorly defined, and usually unnamed, cultural groups in other parts of the region. Reservations were expressed here and there but the general outline more or less remained undisturbed.
This interpretation leads to a second general conclusion: that diffusion was the dominant process by which agriculture and pastoralism became established throughout Eurasia. How far this was the result of colonization by agricultural populations (demic diffusion) and how far it depended on the adoption of crops, domestic animals and agricultural techniques by hunter-gatherers remains a controversial question, but, the most popular opinion is that expanding populations of seed-crop cultivators, associated in some areas with pastoralism, were mainly responsible for the spread of agriculture from the Levant to the West as well as to the East.
As will be seen in the followings, there has been a strong reservation to accept this paradigm in its totality and more and more alternatives are being proposed in recent years which attempt to skirt the issue of the Near East as a sole source of domesticated plants and animals. This is evolving into an active debate, occasionally into an acrimonious one. We shall delve into these arguments as we proceed.
It is known that compared to the Near East, much less archaeological research has been done in other areas for early domestication and food production. This is especially true for the Iranian Plateau east of the Zagros Mountains, extending into the Greater Indus Region. There are only three excavated sites in all of Pakistan that relate to this problem, Kili Gul Mohammad, Gumla and Mehrgarh, and the first two were very small scale probings. In spite of this discrepancy in the intensity and balance in the search for the history of food production and domestication the faith in the primacy of the Levant

remains strong. There remains a sense in much of the archaeological literature that the Near East is, and will remain, the primary region within which this transformation could take place, and that Central Asia and the Greater Indus Region should be viewed as secondary centers which received the gift of farming and herding from the Near Eastern epicenter. As stated elsewhere, some are quite explicit about this view view 144), at other times it seems to be implied. They can also point, with some confidence, to the early dates from Near Eastern sites and the robust archaeological data sets that baks their position.

There is no doubt that there are early dates for food producing sites in the Near East and that the substantial amount of excavation there has yielded a culture historical sequence, but it has led to a kind of self-fulfilling prophesy. Convinced that the Near East was the early center, archaeologists turned their attention to the investigation of this region at the expense of others. Many archaeological research projects have provided the information needed to reconstruct an impressive story for the domestication of plants and animals and document the establishment of village farming communities there. But, what about other regions within which the potentially domesticable plants and animals lived? Having ignored research in virtually all of these other areas, is it surprising that the prediction that the Near East was the center of food production and domestication came true? Of course, it is not surprising; an observation that in and of itself calls for research in what Possehl (5) terms as the "expanded nuclear zone", the region from the Mediterranean to the Indus covering the area from the Arabian Gulf into the Central Asian States. According to this paradigm, one should seek to set aside models that are dependent on "diffusion" and "independent invention" and begin to look at interaction and the rich set of networks of many kinds that linked the peoples of the Near East and its borderlands with their neighbors to the East that include southern Central Asia and the Indus Valley. There is some evidence to support this model for plant and animal domestication that needs a review of the evidence from Mehrgarh and other such sites in the East to make it clear.

The hypothesis of the Levantine Primacy is based on the notion that environmental constraints at the Last Glacial Maximum and afterwards made all but the Mediterranean woodland corridor, with its grasses, cereals and legumes, unsuitable for the emergence of sedentary hunting and gathering. As this is supposed to be the unique zone within which harvesting of wild cereals and legumes began, it thereafter saw the development of farming and the emergence of domesticated forms of those plants (185).

Crudely summarized, the narrative runs that sedentary hunter-gatherers reliant on wild harvests of cereals and legumes had emerged in the early Natufian, and were then profoundly affected by the reduction in resources that was occasioned by the Younger Dryas reversal. As a result, they began to turn to the cultivation of some of those plant species, which led to domestication, and also to the herding of domesticated animals. A revised model due to Hillman (195) seems to have been generally accepted, but on the impact of the Younger Dryas in particular, the reconstruction remains melodramatic.

At the beginning of the early Neolithic, there are several sedentary hunter-gatherer sites outside the Levantine corridor, three of which are in north Iraq. These three communities existed at or beyond the very limit of the distribution of the necessary plant resources according to Hillman’s map for the period, and yet there is good archaeo-botanical evidence from M’lefaat and from Qermez Dere that pulses, wild grasses and some wild barley were in use, and that an open Pistacia woodland environment remained despite the Younger Dryas reversal.

In southeast Turkey, east of Diyarbakır, the sedentary village site of Hallan Chemi was likewise established during the Epi-palaeolithic. There, too, is evidence of the use of pulses and some wild grasses. Given their different cultural assemblages, there is no case to be made that any of these communities - spread from extreme southeast Turkey, across the plains of north Iraq and through the

piedmont and into the intermontane valleys of the Zagros mountains - were recent colonists of these regions who had come from the Levantine corridor.
Another argument for the primacy of the Levantine corridor in the adoption of agriculture depends on the belief that sedentary or semisedentary hunter-gatherers, dependent on stored harvests of wild cereals, grasses and legumes, existed in the Epi-paleolithic period only within that zone. Although we have very few investigated sites of Epi-paleolithic date outside the Levant, there are clues that hunter-gatherer communities elsewhere also harvested and stored cereal and legume harvests. At the end of the Epi-paleolithic period, there was an occupation of Shanidar cave, in the far northeast of Iraq, and a small, open village site nearby at Zawi Chemi. Both sites produced significant numbers of ground stone implements for pounding and grinding foodstuffs, and Zawi Chemi contained some circular stone structures, built within an accumulation of occupation debris that amounted to a couple of meters or more.
At present we lack information on the situation in the Epi-palaeolithic period, but, at the end of the Younger Dryas phase, the archaeological evidence indicates that there were sedentary or semisedentary hunter-harvesters relying on stored supplies of legumes and cereals well outside the narrow confines of the Mediterranean corridor of the Levant. The evidence from Mehrgarh in Baluchistan is also very relevant: the ‘compartment buildings, believed to be storage structures, are found from the earliest period of this site that goes beyond 7000 BC. Since we do not know about their beginning, we cannot assume that such or similar structures did not exist in this region before the onset of agriculture.
In any case, there is a serious methodological problem with the ‘Levantine primacy’ account of the emergence and development of Neolithic societies in southwest Asia, for it is a hypothesis that has been elevated to the status of orthodox account without testing. Further work in the Mediterranean woodland zone and its margins (in Jordan, the Palestinian territories, Israel, the Lebanon, western Syria and around Th.e Euphrates in southeast Turkey) by supporters of the view does not test the hypothesis. If we wish to define the area in Southwest Asia within which sedentary and semi-sedentary hunter-gatherers operated in the Epi-palaeolithic and earliest Neolithic periods, we need to be able to demonstrate its extent by showing which areas were not part of the core area.
Following the widely accepted ideas of the philosopher of science Karl Popper, in order to demonstrate a hypothesis, we need to apply a test that is capable of falsifying the hypothesis. How could we falsify the hypothesis? We need to find sites of the appropriate date outside the assumed core area of the Levantine corridor; if those sites are like those within the core area, then the hypothesis is shown to be false, and the geography of the core area needs revision. If we find sites of the appropriate date that were formed by nonsedentary, non-storing hunter-gatherers, then we know that we are outside the core area, and we are beginning to define the extent of that core area. In Anatolia there are the early signs of early aceramic Neolithic settlement, and even Epi-palaeolithic occupation, on and adjacent to the Konya plain. It appears that, when archaeologists knowledgeable of the period go and look, sites exist. Potentially, falsification testing could take place, but the situation will not be remedied in the short or medium term. Therefore, we should simply abandon the Levantine primacy model, and look at the general archaeological map of southwest Asia as best as we can, relying most on the better-documented parts of the region, but not ignoring the less well-investigated parts (25).
The recent discovery of the extraordinary PPNA type complex at Gobekli Tepe in southeastern Turkey emphasizes the fact that very large areas of South-West Asia still remain underresearched in terms of targeted field-work to a modern standard, as a result of decades of political instabilities and tensions.This applies both to where archaeological surveys and excavations have not taken place, and where botanical and zoological fieldwork has not been undertaken with the aim of modeling the likely distributions of wild cereals, sheep, and goats (including now from the DNA patterns in

modern landrace species). If the distribution of modern wild forms of the cereals and sheep and goats is a general guide to the potential 'hearth(s) of domestication' of the Eurasian farming system, then theoretically the zone of interest of the 'hearth of domestication' should probably stretch from Gibraltar in the west to Kachi plains in Pakistan to the east, and from Cairo in the south to the Crimea in the north. That various species of wild wheat, barley, and legumes were being gathered throughout the Mediterranean in the early Holocene is a timely reminder of the dangers of decades of research focused in one or two small parts of that huge area proving to be self-fulfilling prophecies about their unique status as 'the primary hearth of domestication' of a particular type of plant or animal (25). Another objection we should make to the orthodox theory is that the archaeological data from Israel, Jordan, Syria, and Turkey make it quite clear that we are studying a very long-lived process or processes, not a 'PPNA event'. Practices that can be identified as having many characteristics of animal and/or plant husbandry were being undertaken by the Natufians 5,000 years before the PPNA. However, we can also see that Natufian behavior was profoundly affected by the dramatic climatic and resultant ecological changes after the Last Glacial Maximum. The sudden return to the markedly cold and arid conditions of the Younger Dryas in particular changed the distributions, densities, and seasonal availability of key plants and animals. Herds of gazelle, for example, a species well suited to the return to arid conditions, expanded their range, whereas the wheats and barleys contracted into better-watered refugia. People had to respond to the profound changes brought about to the landscapes in which they lived by the PleistoceneHolocene transition, and clearly did so (25). The presently emerging picture of plant and animal domestication and agricultural origins in the Near East is dramatically different from that drawn 30 years ago by Bar-Yosef and Meadow (42) and quoted so profusely in archaeological literature. There has been an exponential increase in information on this transition not only from the southern Levant but also from other parts of the Fertile Crescent and some parts of Middle Asia that had not been as thoroughly explored in 1995. A number of new archaeobiological approaches to documenting domestication have been developed that are providing powerful new insights into the initial phases of domestication in both plants and animals. While in domestication in both plants and animals. While in year gap between plant and animal domestication, it now seems that both occurred at roughly the same time, with initial management of morphologically wild future plant and animal domesticates reaching back to at least 11,500 years ago, if not earlier (187).

In spite of profound changes in the paradigm of Levantine Primacy, its hold on the theories of agricultural orgins and spread remains intact. As an example, Zeder (187) recently critiqued Bar-Yosef and Meadow in her review article *The Origins of Agriculture in the Near East*, published in the *Current Anthology*. While she described the emerging picture of plant and animal domestication and agricultural origins in the Near East so eloquently and termed it dramatically different from that drawn 30 years ago, the central theme surprisingly remains intact. There are other such examples where the authors pretend to critique the established view of the Levantine Primacy but end up strengthening the Childean narrative than upsetting the apple cart. **Alternative Interpretations:** It has been stated earlier that since the Second World War, study of the origins and early development of agriculture on a world scale has been dominated by the concept of primary or "nuclear" centers where it has been assumed hunter-gatherers initiated crop cultivation and animal breeding and from where agriculture and pastoralism later spread to secondary or "non-centers”: the Near East, or the South-West Asia in general, has been the focus of particular attention as is evident so far in this narration. The fundamental question of how far this core-periphery model of agricultural origins fits the data now available for Eurasia as a whole is being addressed by some scholars in recent times and these views have been referred to here and there without any notable focus on alternative explanations.

The hypothesis of the Levant Primacy in the origins and dispersal of agriculture in Eurasia has so far been accepted as a starting point in almost all accounts. This has also been done in the foregoing pages of this book, although somewhat gingerly. The widely-held view of holding the demic diffusion for the spread of agriculture to Europe, Central Asia and the Indus Valley has also been given considerable weight in the spread of agriculture by many archaeologists, although no one seems to accepting this hypothesis as a dogma. By and large, the Levantine Primacy Model is the currency.
The conventionally accepted model for the origins and spread of agriculture was proposed for whole of Eurasia at a time when the archaeological evidence for early farmers was thin on the ground and that of the cultural stage of the 'recipient forager populations', such as that at Mehrgarh, hardly existed at all. The data base is still exiguous, but certainly no longer fits theories of the beginning of agriculture in Baluchistan and Central Asia as a result of the migration of Near Eastern or West Iranian farmers to these lands. The division of the Near East, Iran, Central Asia, and the Indus Valley into “core” and “prephery’ areas, that lies at the heart of the conventional wisdom, is also coming in question.
Additionally, doubts are being expressed about the well-established theory that early domestication happened where the progenitors of the current crops and herded animals existed prior to their domestication and opinions are being expressed that there is no *a priori* reason why cereal and sheep/goat husbandry is not at least as old in some other parts of the distribution zone of the wild progenitors as in the better-researched parts of the hilly flanks of the Fertile Crescent. The distinctive nature of the kind of mixed farming that developed in Iran, Central Asia, and Baluchistan contemporarily with PPNB farming to the South-West, together with DNA studies of modern cereals and livestock, imply that this may well have been the case.
In recent years, especially in India, there has been a reaction to the assumption that European Civilization, and by implication, that of the Indus Valley and Central Asia, were, to begin with, subordinate to South-West Asia, which Childe termed as the Cradle of Civilization. Childe claimed that European prehistory was 'at first mainly the story of the imitation, or at best adaptation, of oriental achievements. On the opening page of *New Light on the Most Ancient East* he went even further, writing that 'one thread is clearly discernible running through the dark and tangled tale of these prehistoric Europeans: the westward spread, adaptation and transformation of the inventions of the Orient'. By ‘Orient’, of course, he meant the Near East which was increasingly coming in focus. In so far as Childe was inclined to view Europe as a recipient rather than as a creator of culture, it is hardly surprising that the later scholars could give any credit of cultural development to the people of the East. As a result, the East also became a net receiver of culture from the Levant or the Fertile Crescent. This archaeological dogma was, of course, seen as the division of the Old World into the areas of ‘superior’ and ‘inferior‘ civilizations.
This reaction against the extreme diffusionist interpretation was supported by the availability of some radiocarbon dating and the results of a few ground-breaking genetic studies. For example, even on straight uncalibrated dates, farming, pottery and metallurgy are now seen to have appeared in Baluchistan and Central Asia so much earlier than had previously been assumed and that these areas could no longer be seen as hopelessly retarded in cultural development in comparison with Southwest Asia. Genetic studies, although still in their infancy, have also failed to give support to the well-accepted dogma of the Levantine Primacy despite launching a number of studies to prove the migration of seedbearing farmers from the Fertile Crescent to the Indus Valley. Another factor has been a deeper appreciation of the unique character of the Indus Civilization and the process of cultural change, compared to those of Mesopotamia and Central Asia. Unfortunately, position is already hardening and the notion of autothonous origins of the Indus Civilization, starting from the

very beginning of agriculture and animal husbandry, is becoming a sort of
The above discussion, mainly attributable to Trevor Watkin, shows that most authors of synthetic accounts of the Epi-palaeolithic and Neolithic periods in southwest Asia have continued to use the framework of a culture-history narrative, which 30 years ago was shown to be conceptually neat but deeply flawed. As soon as we have bodies of archaeological data from a number of different sites, there are insoluble difficulties in fitting the data to the cultural-group model. We need to face the facts and admit that the notion of the archaeological culture is a very poor approximation of the cultural life of communities in prehistoric (or any other) times.
Those who have pioneered the idea of the interaction sphere have at least sought to find some other kind of 'character' to populate their narratives; however, the users of the term need to tell us a good deal more about how they see the interaction sphere phenomenon as operating, especially as the use of the term in relation to the PPNB phenomenon is quite different from its use by its American originators.
The focus also shifted to a related matter, the assumption of a fundamentally diffusionist model, which has given us the core-periphery model of the Epi-palaeolithic and Neolithic periods, defined as the Levantine primacy school. Trevor Watkins (185) sought to argue that the idea that a Mediterranean corridor was the area of southwest Asia within which new kinds of subsistence and settlement strategy were evolved, where later the earliest cultivation and domestication of plants took place, is poorly founded in the archaeological and environmental facts. He concluded that, as a hypothesis, it needs to be tested with falsification tests, which means that we need investigations on sites that the hypothesis says are outside the core

had shifted again, this time to southeast Turkey, where the upper Euphrates river comes closest to the Karac¸ adag mountains. Lev-Yadun et al. (2000) declared this as the 'core area' for agricultural origins. This core area was defined also by the overlap of modern

The Spread of Agriculture in Pakistan
wild progenitor ranges of emmer wheat, einkorn wheat, barley, pea, lentil, chickpea and region: the Levantine primacy hypothesis cannot be tempts to define cultural groups of the kind that
tested by yet more investigations of archaeologicalbitter vetch in this same region (Fig. 1). Kozłowski and Aurenche (2005) have taken on
sites or sources of environmental data from within ridor, even though clusters of sites have begun to that region.
this singular area of domestication as their 'golden triangle' (cf. Asouti 2006: 95). On
build up, for example, across southeast Turkey and
archaeological grounds, Bar-Yosef (2003) postulated an adjacent and overlapping core on
model with cultural groups serving as the 'characIn the next section we take issue with both
the Upper to Middle Euphrates.
ters' in the narrative causes difficulties for archaeof these positions, question the traditionally well
ologists working within the presumed core region,Nevertheless, there has been a growing body of studies that do not fit with any one core
and even greater difficulties for those working elseagriculture, discount the concept of wholly indigewhere. The interminable questions and arguments
area, but suggest a dispersed group of parallel processes (Allaby et al. 2010; Asouti 2010;
nous agricultural developments anywhere in Middle
concerning the application of the PPNB culturalBelfer-Cohen and Goring Morris 2010; Brown et al. 2009; Fuller 2007, 2008; Nesbitt 2004;

chronological framework to particular sites and re(a) that the archaeological evidence contradicts

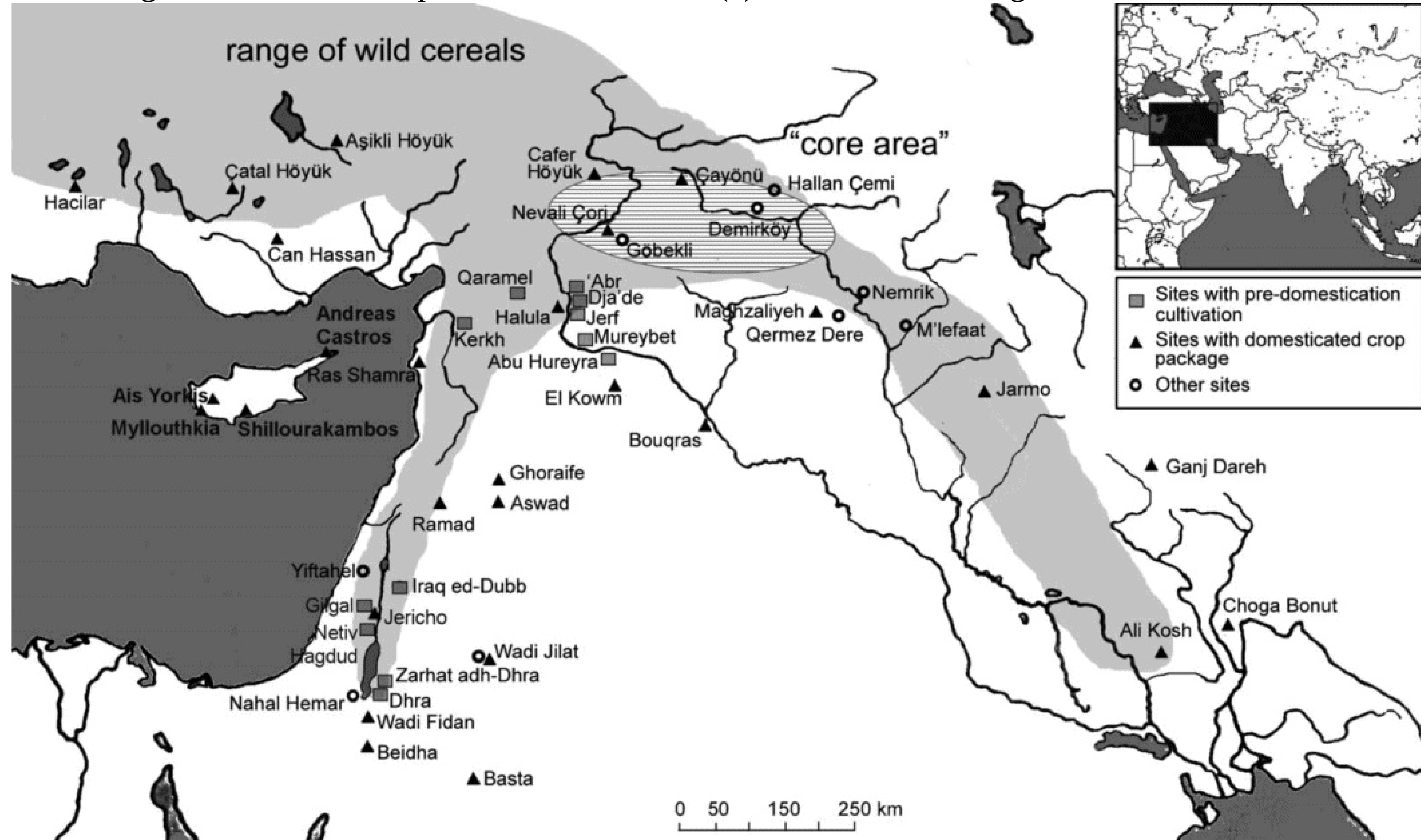


Figure 1 Map of the Near Eastern early Neolithic sites with archaeobotanical evidence, in relation to
Map of the Near Eastern early Neolithic sites with archaeobotanical evidence, in relation to the hypothetical Levantine Core
the general distribution of wild cereals and the hypothetical Core Area, based on the overlap of a
cultivation and those with an established package of domesticates (presence of at least two confirmed morphological domesselection of progenitors, including
Cicer arietinum.
ticates and at least a third domesticate/ semi-domesticated (Sites are diff *Fuller et al, ref. 234*) erentiated into those with inferred
pre-domestication cultivation (Table 1) and those with an established package of domesticates (presence of at least two confirmed morphological domesticates and at least a third domesticate/
gions are witness to that. Similar arguments occur
semi-domesticated, based on Table 1).

over the application of the term Natufian (or early, middle, late or final Natufian) in relation to particular assemblages. But the difficulties are even greater for those who look beyond the Mediterranean corridor, where the cultural paradigms of the Natufian, PPNA and PPNB simply have no relevance, but are nevertheless applied.

Fifty years ago, the solution to this problem might have been to recommend a lot more field investigation in regions of southwest Asia other than the Mediterranean corridor, in the hope of accumulating enough data from enough sites so that other cultural groups would gradually emerge. It is interesting to note that there have been very few atthe orthodox interpretation or "core" and "periphery" paradigm;
(b) that the environmental evidence for Levantine Primacy hypopothesis is less than clear cut; (c) that

the hypothesis of Levantine primacy is in fact an untested, but testable assertion;
(d) that the core areas of progenitors may not necessarily be the areas of original domestication; (e) that the spread of agriculture, even if it origi- nated in the Levant, cannot be explained through demic diffusion;
(e) that no region of the Middle Asia can claim the sole originator of agriculture and animal herding without some input from other areas.

Instead of the core-periphery model, we consider here the evidence for the movements of resources over long distances, linking very different kinds of farming and foraging societies throughout the region that spans from the Mediterranean to the Indus and from Fars to Turkmenia. Whatever the intermediaries, the farmers of this vast region may have acquired some of their cereal crops, millets and pulses through variously constructed cultural exchange relationships with the neighboring regions while propagating their own inventions and acquisitions to the farmers and foragers of these lands in return. The Levantine primacy is explicitly rejected.

According to this model, the whole area that spans from the eastern shores of the Mediterranean to the banks of the Indus and extends northward as far as the hilly flanks southern Turkmenia constituted one single cultural and ecological region in which several pockets of Neolithic cultures interacted with each other to develop a common but regionally differentiated set of crops and domesticated animals. Since the Near East has been explored much more vigorously and, as a result, since much stronger evidence for the origin of domestication and agriculture have come from there, the western ‘hilly flanks‘, of the central plateau, that is the slopes of the Zogros, has emerged as the ‘core area’ for the beginning of ‘agricultural revolution. Thus, it is an outcome of the default rather than a choice.

ARGUMENTS AGAINST THE LEVANTINE PRIMACY

The archaeological quest for agricultural origins has long sought to pinpoint a key place where it all began. In the 1980s, when the best-known sequence was that of the Southern Levant, explanatory models for the beginnings of agriculture in the West Asia focused on this region and the transition from the Natufian to the Pre-Pottery Neolithic (24). This replaced an earlier interest in the hilly flanks of the Zagros and Taurus mountains where ecological models had been developed to explain domestication in the 1960s and 1970s (229). However, by the end of the 1990s the centre of origin had shifted again, this time to southeast Turkey, where the upper Euphrates river comes closest to the Karacadag mountains. Lev-Yadun et al. (203) declared this as the ‘core area’ for agricultural origins. This core area was defined also by the overlap of modern wild progenitor ranges of emmer wheat, einkorn wheat, barley, pea, lentil, chickpea and bitter vetch in this same region. Kozłowski and Aurenche (230) have taken on this singular area of domestication as their ‘golden triangle’. On archaeological grounds, BarYosef (223) postulated an adjacent and overlapping core on the Upper to Middle Euphrates.

Nevertheless, there has been a growing body of studies that do not fit with any one core area, but suggest a dispersed group of parallel processes. (228,231,232,233,234,235,236,237).While some have declared a paradigm shift to multiple and protracted origins (238), there remains the contention that domestication happened just once in the Near East in a contracted area over a fairly short time of at most a few centuries (239,240,241). Haldersen et al. (242) argued explicitly for a rapid, single domestication event, implying that archaeobotanical evidence is inadequate and flawed as a means of

studying domestication. In a recent paper, Fuller and associates (228) debate the existence of a single core of domestication in the Near East and defend the importance of systematically collected and studied archaeobotanical evidence for studying the origins of agriculture. A diffuse and protracted process of origins in Southwest Asia is representative of recurrent global processes: evidence from other continents also suggests multiple locales and paces of domestication. While this implies that there was no one prime mover globally that caused humans to farm, Fuller et al hypothesize that it is symptomatic of shared, ancestral human predilections towards landscape management. Graeme Barker (25) and Possehl (5) take these leads and extends the argument to cover a vast area encompassing the Near East, Iran, Central Asia, Afghanistan and the Greater Indus Valley.

Evolving genetic approaches to pinpointing domestication: As molecular genetic approaches to organismal diversity became increasingly available, it seemed obvious that this would provide a new tool for definitively identifying where species were domesticated. Genes after all are the products of evolutionary history, and should allow for inferring the phylogenetic pattern of that history. It would seem obvious then to ask whether a crop was monophyletic or polyphyletic with regard to its wild progenitor, and to use these patterns to infer where domestication had occurred. Unfortunately, this intuitive inference hides serious flaws (228), which have become increasingly apparent as both the total amount of genetic data has increased and as the mathematics (bioinformatics) of dealing with these data has improved. Genetic data are reflections not merely of phylogenetic history but also of the processes of population genetics: drift, selection, linkage, lineage extinction and lineage sorting. In 1997, Heun et al. (225) published the first major molecular genetic study of domestication, pinpointing the modern wild population of einkorn of the Karaca Dag mountains (South-eastern Turkey) as the ancestors from which einkorn had been domesticated in the Neolithic. This study became a model (AFLP ‘finger-printing’) followed in numerous other studies, on crops from barley. This extended to the more general model of genome wide markers (GWM), such as micro-satellites, for instance on maize , cassava and emmer, which are subject to the same pitfalls. Despite its flawed assumptions, the conclusion that all einkorn derived from a single rapid domestication event in the Karaca Dag mountains remains a persistent factoid. We ourselves have repeated this factoid quite a few times in this book and this continues to bias interpretations of Near Eastern archaeological evidence towards locating a single source of agriculture in Southeast Turkey.

There are problems with the assumption that modern wild and cultivated populations represent all those of the past, assuming that there have been no local extinctions, despite millennia of climatic changes and human impacts, and assuming that no evolution – by adaptation or by genetic drift – might have altered the picture in modern wild populations. Even if this objection could be set aside as insignificant, the method of analysis assumed that the history since domestication had been entirely tree-like, with divergence between populations and never hybridization. Even in a selfing species such as wheat, in which cross pollination may be as low as 1–2 per cent, there was gene flow and hybridization. Indeed hybridizations have been very important from an agricultural point of view, providing for polyploidy, including the evolution of wild emmer (before it was ever domesticated) and hexaploid wheats such as bread wheat and spelt which resulted from hybridizations after emmer had been domesticated (228). Hybridization events have been important in the evolution of many crops, from bananas to Asian rice. Simulated data showed that the methods used by Heun et al. (225) would almost always infer a single origin even when more than one origin was simulated (231,244). In other words, that type of data and analytical method was unable to detect multiple domestication events. Meanwhile other genetic studies, using other systems, provided increasingly heterogeneous results, suggesting the capture of multiple wild genotypes with domestication, which seems to imply

two or more domestications in einkorn, emmer, barley, and lentil.

The accumulation of archaeobotanical evidence also highlights the inadequacy of relying only on the genetics of modern plant collections in order to infer the history of domestication. Archaeobotanists now recognize several morphological cereal types no longer present among modern cultivated germplasm. These archaeological taxa imply additional domestication events and the dispersal of lost crop lineages. Among these were two-grained einkorn, documented as a wild resource in the Epipalaeolithic, as an inferred cultivar on upper Euphrates sites such as Jerf el Ahmer, Mureybet and Dja'de, and later as a domesticated cereal at many PPNB sites from Anatolia to the Jordan (243). This species also spread to Neolithic Europe, where it became especially prominent in the Neolithic of Southeast and central Europe. While it seems to disappear from the archaeological record in its Syrian homeland by c. 5000 BC, it persists in Europe until the later Bronze Age, becoming extinct perhaps around 1000 BC.
A similar story can now be sketched for a striate emmeroid wheat, the so-called 'new type glume wheat', which is known from Anatolia, Eastern and Central Europe and Turkmenistan (245), and similarly disappeared from European agriculture during the Bronze Age. Similar examples could be cited from animals, such as pigs (246). Thus we must conclude that modern genetic data, even with the best of modern methodologies, can at best provide a partial evolutionary history of crops.

Archaeobotanicalspecialistsworkingwith Near Eastern material have come to recognize that domestication was a prolonged process. Hillman and Davis (247) had hypothesized that domestication could have been quite rapid (twenty to 100 years) based on extrapolation of modern experiments, and an assumption of shifting cultivation, but the archaeological data to test this rapidity did not become available in quantity until the past few years. Two lines of archaeobotanical evidence, however, argue against rapid domestication: evidence for pre- domestication cultivation and the gradual replacement of wild-type morphological traits by domesticated morphological traits over several millennia.

The appearance of domesticates: core area or mosaic? Fuller et al (228) provide a detailed archaeobotanical assessment of the evidence for the 'core area' in comparison to other parts of the Near East. All regions of the fertile crescent show a pattern of an increasing range of probable crops over time and a delayed but increasing range of confirmed domesticates. According to the collected data, early cultivation in the Near East, (and by implication in the surrounding areas) appears to have been multi-focal and piecemeal. From this it can be seen that no site or region in the PPNA or Early PPNB can claim to represent the Near Eastern founder crops (234). Instead different local selections seem to be in operation. Some lost crops, such as rye and two-grained einkorn have surprisingly wide distributions. Fuller ret al infer from this that different local wild populations were brought into cultivation and in multiple contexts were selected for domestication adaptations. The situation in Cyprus is striking in that no single pattern of cereals cultivated is common to all the sites, and cereals arrived on Cyprus before they were morphologically domesticated on the mainland.

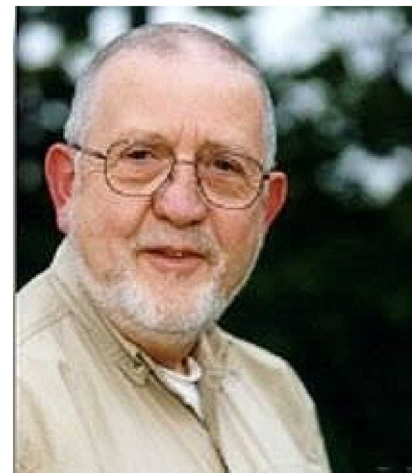
Theultimateagriculturaleconomiesthat came together by the Late Pre-Pottery Neolithic included livestock as well as crops. The appearance of livestock also appears similarly diffuse (234, 248,249).

Multi-focal agricultural origins: a worldwide pattern: Thus the package of founder crops (and some lost crops) was not found growing wild and brought into cultivation as one prescient invention, but instead was assembled piecemeal and gradually over an extended period of millennia together with livestock and latecomers such as olive and almond. Other parts of the world suggest similarly

multi-focal processes, with many instances in which only a single crop was initially cultivated, undermining the inference of Abbo et al. (239,240) that an overlapping package of crops was a necessary condition of early agriculture, and that therefore the region of overlap of wild progenitors should outline a domestication 'core'.

Whether we accept only three or nine or ten centers or accept that there could have been as many as twenty or twenty-four, it seems clear that agriculture was not invented once and only once. When looked at in detail each of these 'centers', like the Near East or the Kachi plains, begins to look like a regional mosaic, or a 'non-centre' in Harlan's terms. A full review of these origins is beyond the scope of the present comments, but it is worth noting that in many instances multiple domestications are indicated for the better-documented species, and that large complementary packages of crops are not a prerequisite for cultivation.

THE INTERCONNECTED REGION OF MIDDLE ASIA



Trevor Watkins
Supra-Regional Networks in the Neolithic Southwest

Asia, 2012

The core-periphery hypothesis has worked well enough because it fits nicely with a particular view of the Levant as the preeminent core area within which all the significant cultural and economic advances were first achieved, and from which these innovations were then diffused to Europe. This hypothesis, however fails to explain the situation in

Baluchistan, northern Afghanistan, and Central Asia where the temporal gap between the agricultural developments between these areas and the 'core' Levant is minimal, if at all. This state of affairs has created a lot of discontent among the scholars but so far no alternative paradigm has been offered. Gregory

Possehl (5) offered a tentative proposal, which he calls the "Expanded Nuclear Zone" hypothesis. This concept was later on expanded by Graeme Barker (25) in his book

The Agricultural Revolution in Prehistory , published in 2006. Trevor Watkins (185) also advocated the concept of Supra-Regional Networks of Southwest Asia for locating the origins of the Neolithic.

Interconnected Region of the Near East, Iran, Central Asia, and the Indus Valley: We start with

exploring the evidence for the geographic, environmental and cultural interconnectedness of the region that spans from the Mediterranean, across the Iranian Plateau, to the Indus Valley and Central Asia, including Afghanistan, right from the Glacial Maximum to the onset of urbanism in some parts of the region. The relevant archaeological evidence is meager but there is some. Such a review is helpful in showing the geographic and environmental commonalities and differences of the region on which the paradigm of 'expanded nuclear zone' is primarily based. If nothing else, at least it sets the tone.

Within the boundaries of a geographic unit like Pakistan, similarities among archaeological assemblages generaly inform us about communication or interaction among people who were responsible for creating those assemblages. This communication and interaction was undoubtedly made manifest in many ways, both directly and indirectly, through third, fourth, fifth, n... parties. Individual innovations in culture and technology that had value to these peoples were spread in these ways throughout this region; for the most part this communication probably happened very quickly, over a matter of a few years, but the acceptance and implementation of change may have taken longer. Such change coiuld be accepted within the variable sociocultural systems of the Greater Indus Region because there were probably some close, underlying sociocultural similarities a,nog those diverse peoples.

I feel that we have indeed continued to use inadequate frameworks for our narratives of prehistory, new and heady wine of new discoveries into leaky old wine-skins. Those narratives, reshaped to accommodate new data, are nevertheless condemned to being inappropriate and even misleading. *Trevor Watkins* **constructing**

putting the

As Gregory Possehl has noted (5), there is evidence for variation in the frequency and intimacy of the various forms of communication and interaction with the people of Afghanistan, Central Asia, Iran and through them with the Near East, throughout the Indus Age. The region was alive with activity linking the diverse peoples of the Indus Age with the other peoples of the region - it is just that sometimes it was more alive than others.

The form that this communication and interaction took is not known in detail, or even with much certainty, but we have some hints of a range of activities that can be note here. These come from the study of archaeology, historical and ethnographic records and a reading of the cultural geography. The records of climate change and ecology is another source of information.

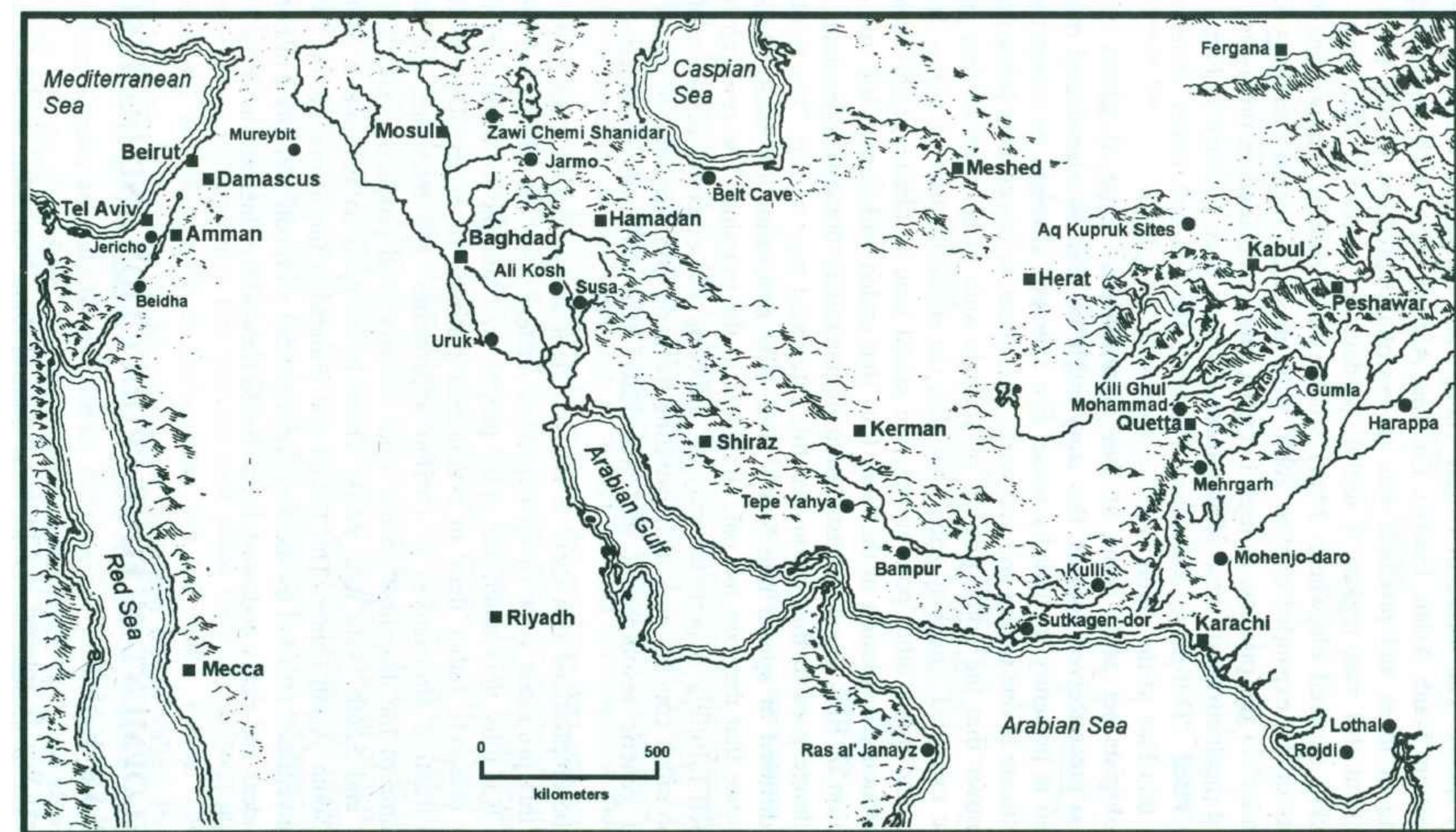
It is clear that the peoples of the Indus Age had a heavy dependence on animals, especially cattle, sheep and goats. So were the other peoples of the region, ranging from the Fertile Crescent to Iran to Central Asia. In this sense they were pastoralists, whether settled or nomadic. Season nomadism must have been common throughout the region and the needs for pasture must have been intense. According to Possehl, this leads unmistakably to the proposition that the constant search for pasture might have been one of the most important of the great engines that drive the interaction and communication within the Greater Indus Region and with the adjoining areas of Afghanistan and Iran, even as far as southern Turkmenia. These direct communications and interactions would then multiply manyfold through a relay system, reaching the areas far removed.

Another related activity has to do with bards, and people who carry news. These are 'professional'

wanderers who tell tales, keep an oral folk literature alive and carry to new localities information of happenings in the places they have visited. They tell of famines and plagues, war and peace, new inventions and discoveries,and novel raw materials and places. Along with these bards are the

While we have some grasp of the specifics of the ancient world in terms of the distribution mechanism of raw materials and artifacts, we are in a real difficulty when we attempt to speculate on the distribution of domesticated plants and animals, seeds of crops and fruit trees, implements of agriculture, and the like. This difficulty multiplies manyfold when we note the time period of our interest - starting from the end of the Pleistocene and ending in the middle of the Holocene. On top of it, the regional and temporal variations in climate have to be contented. Keeping all this in view, a summary of the region from the glacial maximum to the midHolocene is presented in the followings. We particularly stress the cultural inter-relationship, similarities, and contrasts between the various areas of this vast Middle Asian region. The temporal connection between the subsistence practices of the region is

M i d d l e A s i a



The Middle Asia region with possibly domesticable plants and animals on which the Indus Age was founded (Possehl (5)

traveling ‘traders and merchants‘ who compliment a rudimentary system of exchange and gift giving and receiving. It is these and related activities that were the forces of diffusion and migration, whether direct or indirect. The word ‘diffusion’ is not used much in this book, but the study of the spread of the Neolithic culture is certainly concerned with the distribution of artifacts. Since we know that the artifacts themselves did not move in some self-propelled fashion across the region, it is the movement of people - whether direct or in a relay - that comes into picture.
equally important. Our focus is the all-important time period when the people of this region were

attempting to domesticate plants and animals and gradually settling down in agricultural villages. This is the transition time from the life of foragers to the settled life of food producers.

Late Pleistocene Settlement: ca. 20,000 9,500 BC: Paleoenvironmental data are still very limited for the region, but there seems to be a general consensus that the late Pleistocene was characterized by considerable aridity in the region, with the south-west monsoons being much weaker than today everywhere in the region (8,158). The effect of the south-west monsoons strengthened after the Last Glacial Maximum, bringing greater seasonality and increased summer precipitation. Foragers moved in and out of the deserts in response to these fluctuations in aridity, the desert probably being abandoned entirely in the Last Glacial Maxumum, only being reoccupied about 14,000-13,000 years ago (197). There was a brief lapse in this process during the Younger Dryas in the Near East and probably in other parts of the region also. Interleaved sandy, silty, and clayey layers in the Didwana salt lake (In Rajasthan on the eastern borders of Pakistan) are a record of rapidly changing environments at this time, the reoccupation of the desert taking place in an episode of climatic amelioration (168) contemporary with the interstadial conditions that allowed the colonization of the steppe zone by early Natufians to the west.

Lithic industries comparable to those of the Zagros mountains have been found at several caves in north-east Iran, such as Ali Tappeh on the edge of the Caspian Sea, and Ghar-i-Asp (Horse Cave, or Aq Kupruk II) in Afghanistan (198,199). Ghar-i-Asp has a date of about 15,000 BC, together with a non-geometric microlithic industry of a kind that developed further west in the early Holocene. Davis accepted the Ghar-i-Asp date, whereas Russian scholars, on the basis of comparisons with sites investigated further north, suggested that it was probably too early. Either way, the site was being used by people who were hunting wild sheep and goats, together with cattle and red deer (200).

Today the range of the wild argali sheep *Ovis ammon* and the Siberian ibex *Capra ibex siberica* extends from the slopes of the Fertile Crescent into the Hindu Kush, whereas the smaller wild urial sheep *Ovis orientalis* and wild bezoar goat *Capra hircus aegagrus* are only found in Afghanistan and northern Pakistan further east. The sheep and goat bones from Ghar-Asp studied by Dexter Perkins were small
Perkins's conclusion
(201). Meadows accepts

that the wild sheep being hunted from Ghar-i-Asp in the late Pleistocene were argali, but disagrees with the identification of the bezoar goat, suggesting from (admittedly later) horn core evidence that the wild goats were probably Siberian ibex. Sheep and gazelle were also hunted at Kara Kamar I in central Asia. There is no information on plant gathering, though there were simple grinding stones at Ghar-i-Asp and wild barley grows in the locality today. The impression is that late Pleistocene settlement here was much as in the Zagros, based primarily on logistical hunting, with little sedentism (25).

The final Paleolithic industries of Pakistan are generally microlithic, with many backed blades. As in Afghanistan, most sites known post-date the Last Glacial Maximum. Evidence is best from the southern parts of the Indus plains and the coastal regions of Sindh. Microwear studies of the microliths from the western fringes of the Thar indicates the working of hide, bone, and antler, but most of the blades were being used to cut plant materials (202), suggesting that, as we might expect, gathering was more important in the plains than in the mountains and steppes of Baluchistan,

Afghanistan, and Central Asia. As discussed in Chapter IV.1, Similar developments are also at hand in the Near East.

Farmers in the Near East, Central Asia and Baluchistan: ca. 9500-6000 BC: The presently emerging picture of plant and animal domestication and agricultural origins in the Near East is dramatically different from that drawn 20 years ago in a landmark article by Bar-Yosef and Meadow (28), and repeatedly quoted in Chapter IV.1. While in and repeatedly quoted in Chapter IV.1. While in year gap between plant and animal domestication, it now seems that both occurred at roughly the same time, with initial management of morphologically wild future plant and animal domesticates reaching back to at least 11,500 years ago, if not earlier (187). A focus on the southern Levant as the core area for crop domestication and diffusion has been replaced by a more pluralistic view that sees domestication of various crops and livestock occurring, sometimes multiple times in the same species, across the entire region, which is here under consideration (187).

Morphological change can no longer be held to be a leading-edge indicator of domestication. Instead, it appears that a long period of increasingly intensive human management preceded the manifestation of archaeologically detectable morphological change in managed crops and livestock. Agriculture in the Near East arose in the context of broad-based systematic human efforts at modifying local environments and biotic communities to encourage plant and animal resources of economic interest. This process took place across the entire Fertile Crescent during a period of dramatic post-Pleistocene climate and environmental change with considerable regional variation in the scope and intensity of these activities as well as in the range of resources being manipulated.

At the time Bar-Yosuf and Meadow's influential article (42) was published, it appeared that the southern Levant was the core area for initial domestication, and a case could be made that all subsequent crop and livestock domestication in other parts of the Fertile Crescent and beyond followed on the precedent of the crops, domestic technology, and the Neolithic way of life introduced from this core region. Since then, the spotlight has shifted to the central Fertile Crescent, especially the upper reaches of the Tigris and Euphrates rivers, which appears to be the homeland of the initial domestication of a number of founder crops (einkorn, emmer, pulses) and three, if not four, livestock species (sheep, pigs, cattle, and possibly goats). By the late 1990s, a compelling case could be made that this region was a "cradle of agriculture" in a true Vavlovian sense (203). Genetic and archaeobiological evidence generated since then paints a much less focused, more diffuse picture of agricultural origins. The emergence of agriculture in the Near East now seems to have been a pluralistic process with initial domestication of various crops and livestock occurring, sometimes multiple times in the same species, across the entire region which we call Middle Asia.

In 1995, morphological change in both plants and animals marked the threshold between wild and domestic. We now know that morphological change may have occurred quite late in the domestication process and can no longer be considered a leadingedge indicator of domestication. In cereals, the transition from brittle to tough rachises may actually have been the result of changes in harvest timing and technology that took place well after people began sowing harvested seed stock. In pulses, seed-size change lagged behind changes in seed dormancy and plant yield that cannot be detected in the archaeological record. In animals, the impact of human management on body size is now known to have been restricted to a decrease in the degree of sexual dimorphism; alterations in skull morphology may have resulted from a developing commensal relationship rather than a two-way domestic partnership; and changes in horn size and form may, like changes in rachis morphology,

have reflected a change in management practice rather than the initiation of animal management. In fact, in both plants and animals, archaeologically detectable morphological indicators of domestication may have occurred only once managed plants and animals were isolated from free-living populations and the opportunity for introgression or restocking managed populations with wild ones was eliminated. While some may prefer not to call a plant or an animal a domesticate until this separation has occurred, concentrating solely on this late stage of the process will not help us understand how it began (59).

When Bar-Yosef and Meadow published their synthesis article, it seemed to have taken up to 2,000 years after initial domestication of both plants and animals for fully developed agricultural economies to coalesce across the entire Fertile Crescent. With the removal of morphological change as a leading-edge indicator of domestication, this process seems to have taken longer still. Stable and highly sustainable subsistence economies based on a mix of free-living, managed, and fully domesticated resources now seem to have persisted for 4,000 years or more before the crystallization of agricultural economies based primarily on domestic crops and livestock in the Near East.

The Caspian Sea littoral and the Hindu Kush mountains continued to be used by people hunting sheep, goats, and gazelle at sites like Belt Cave but it is also possible that herding started to develop early in the Holocene. Ghar-i-Mar (Snake Cave, or Aq Kupruk I) produced radiocarbon dates from the 1950s excavations that calibrated would be *ca.* 9000 and 7500 BC. In his brief note on the fauna, Perkins (201) argued from horncore morphology and skeletal part size that both domesticated sheep and goats were present as well as wild cattle, gazelle, red deer, and an equid. Unfortunately the material is not now accessible for study, and from a reconsideration of Perkins's notes, Meadow (128) concluded that it was impossible to judge the strength of the case.

Ghar-i-Mar is outside the modern range of the mouflon sheep, though well inside the range of the urial and argali. The mouflon's range may well have extended right across Afghanistan in the early Holocene, but the case for the mouflon being the only possible ancestor of domesticated sheep rests on the assumption that all breeds of sheep tested cytogenetically include direct descendants of early domestic sheep in Central Asia (10) and it is possible that locally domesticated animals could have been replaced later by imported breeds. Local domestication of wild sheep and goat populations in Central Asia and Baluchistan cannot be ruled out on the archaeological evidence; DNA patterning in modern sheep and goat populations also points to a few geographically separated domestication events rather than single domestication events in SouthWest Asia (204,134). The same levels at Ghar-i-Mar also contained querns, pounders, stone bowls, and sickles, so presumably plants of some kind were being processed (205).

By perhaps the middle of the seventh millennium BC (the dates are uncertain, as the samples were dated a long time ago), the people at Belt Cave and Ghar-i-Mar used a stone technology that included a variety of querns, grinders, stone bowls, stone axes, pressure-flaked points, and sickle blades, as well as simple pottery fired at low temperatures. Charred grain was also found in these levels at Ghar-i-Mar, but it has not been identified. The fauna included domestic sheep and goats, gazelle, red deer, and cattle, the wild or domestic status of the latter remaining uncertain. However, it seems clear that by the later seventh millennium BC the people in the Hindu Kush were combining hunting and gathering with herding and, probably, smallscale cereal cultivation (25).

By this time, though, there were certainly substantial agricultural villages in Turkmenistan. The best

known is Jeitun, first excavated in the 1950s and then reinvestigated in the 1990s (56,206,196). Other sites include Chagylli-depe and Togolok-depe. The 1950s excavations at Jeitun revealed some twenty small rectangular dwellings: they were single-roomed, each with a hearth and storage silos. The later excavations recovered seeds and other remains of einkorn, emmer, and what is probably bread wheat, naked and hulled sixrow barley, and various other weedy plants associated with cereal fields. The nature of the harvest debris indicated that the cereal ears were harvested first, and then the stubble at a second stage. Use wear analysis confirmed that the sickles were used for harvesting cereals and a variety of mortars and pestles for processing them (207).

These Turkmenistan farming settlements are located at the edge of the piedmont in a region of low rainfall today, marginal for cereal cultivation, and environmental studies indicate that the rainfall regime then was much the same as it is today. On the evidence of rush seeds in the crop residues, Neolithic farmers coped with the aridity of the region by growing their crops on marshy soils where the water table was high, to make use of groundwater moisture, like many PPNB farmers in South-West Asia (207).

The analysis of the Jeitun fauna indicated the hunting of wild sheep and goats, probably hurials and bezoars, respectively and gazelle, and the herding of domestic sheep and goats, confirmation of the latter activity coming from the discovery of goat droppings in the yards. The high proportion of juvenile animals in the domestic flock indicates a husbandry system geared to meat production, and use wear studies of the stone blades show that many were used for meat butchery and others for working leather. The meatier parts of the carcass were processed inside the dwellings and the extremity bones needed for tool manufacture kept outside (207).

David Harris discusses the case for and against agriculture developing independently in Turkmenistan (206). The region is within the modern range of wild wheats and barleys, and the reliance on einkorn at Jeitun is unusual compared with South-West Asia, where emmer is invariably the main crop at PPN sites. The contemporary site of Mehrgarh in Baluchistan considered below is also different again, with a predominance of freethreshing hexaploid wheats, emphasizing the distinctiveness of early farming in Turkmenistan. However, despite this evidence for distinct regional differences in the early practice of the Eurasian crop system, Harris suggests that cereals were probably not domesticated independently in Turkmenistan because the supposed wild ancestor of einkorn, *Triticum boeoticum,* is not found in the region today. David Harris reaches a similar conclusion regarding sheep domestication, again on the evidence of the modern distribution of the mouflon, the supposed wild progenitor of sheep, because the urial, rather than the mouflon, is found in the region today.

The implication of this argument is that mixed farming must have begun at Jeitun in the later seventh millennium BC as part of a dramatic expansion of PPNB farming from South-West Asia. Harris does not speculate as to the nature of this expansion, which would presumably imply either the spread of farmers from the Zagros mountains across the Iranian plateau in search of new land, or the adoption of farming by the local Turkmenistan hunter-gatherer population through trade contact with farmers elsewhere (again, presumably on the eastern side of the Zagros in Iran). Interestingly, though, the pottery made by the Jeitun farmers has many more similarities with that of the Hindu Kush caves to the east than with that of pottery of Neolithic sites in the Zagros or on the Iranian plateau.

The diffusion model would presumably envisage three millennia of hunting and gathering here followed by the adoption of PPNB-type farming by local foragers from contact with PPNB farmers,

or the displacement of local foragers by incoming PPNB farmers. The main problem, however, is that we do not know what was happening in Turkmenistan between, say, 9500 and 6500 BC, that is, before the appearance of pottery-using farmers at Jeitun. It is quite possible that Jeitun represents the

"It's painful for us to be torn away from the womb-like security of accepted concepts".

Erwin Chargaff, biochemist (1905–2002)

culmination of a local trajectory of changing systems of cereal, sheep, and goat exploitation that has yet to be discovered, a Turkmenistan PPNA (207). The Ghar-i-Mar evidence suggests that such a sequence may be more rather than less likely to be discovered in the future.

The most important early farming settlement in Baluchistan, as discussed in details elsewhere in this volume, is Mehrgarh, about 100 kilometres south-east of Quetta, at the foot of the Suleiman mountains at the point where the Bolan pass opens out onto the Kachi plain (134,208,209). Excavations in the oldest of a series of mounds here found a deep sequence - some 9 meters - of aceramic Neolithic occupation, in which four main phases of occupation were recognized. Precisely when settlement began at Mehrgarh is unclear. The top level, with a few sherds of Jeitun-like pottery, has been dated to the fifth millennium BC. The third level has radiocarbon dates which (calibrated) suggest occupation in the eighth millennium BC. Hence the earliest level should go back certainly to the eighth and possibly to the ninth millennium B C , contemporary with the beginnings of the PPNB in South-West Asia (207) Furthermore, unlike the simple one-roomed dwellings at Jeitun, from the first phase at Mehrgarh there were complex multiroomed structures made of moulded unbaked mudbricks.

The building exposed from the first phase consisted of a series of rooms within a complex measuring six by 3.5 meters. The walls survived to a height of almost a meter, but there were no doorways, or domestic artifacts, suggesting that the structure was designed for storage, perhaps communally organized. The dead were formally separated from the living in cemeteries. People were buried flexed, at different orientations, accompanied by an array of grave goods such as shell pendants, bead necklaces, bone rings, and baskets. One skeleton was buried accompanied by a necklace of lapiz lazuli and turquoise beads, the materials from which must have originated in Iran, together with a shell and stone bracelet, and a stone chisel. There were also textile traces on the body (207).

The people living at Merhgarh were cultivators. The plant remains consist mainly of impressions in mud brick, though there are also carbonized remains, with naked six-row barley the commonest plant represented in both (16,90). However, other crops found in the first phase included einkorn, emmer, hard or durum wheat, two-row and six-row hulled barley, and date *(Phoenix dactylifera)*. The only wild plants found in this level were the jujube fruit *(Ziziphus jujuba)* and morphologically wild grains of two-row barley. Wild barley grows around the site today, and Costantini argued from the distinctive character of the naked six-row barley grains (90 per cent of the plant remains in the basal levels) that barley was probably domesticated locally. The wild wheats do not grow in the region today, but the durum wheat, fully domesticated from the outset according to morphological criteria, could have developed through hybridization with the wheat-relative *Aegilops squarrosa*. Dates are also native to the region. In short, he suggests, there seems no reason to argue that the crops being grown by the first farmers at Mehrgarh had to be derived as domesticates from South-West Asia introduced by exchange or direct population displacement. Interestingly, a study of the morphologies of the teeth of the human population at Mehrgarh also found them to imply a distinct breeding

population, quite distinct from that of SouthWest Asia (210)

Hunting rather than herding seems to have been the other main subsistence pursuit. The greater part of the meat consumed by the first inhabitants of the site was from game, especially gazelle and other medium-size herbivores such as barasingha or swamp deer *(Cervus duvauceli)*, blackbuck *(Antelope cervicapra)*, chital or spotted deer *(Axis axis)*, wild ass *(Equus hemionus)*, wild goat, and sheep. Other animals hunted included boar, bigger animals such as the eland-like nilgai *(Boselaphus tragocamelus)*, wild cattle (presumably *Bos namadicus)*, water buffalo, and elephant, and smaller game such as fox, jungle cat, and jackal. The domestic animals represented were dog, sheep and goats, and cattle, the latter identified as the humped zebu *Bos indicus* on the basis of skull morphology and dorsal vertebrae. The presence of both domestic and wild cattle, sheep, and goats at aceramic Mehrgarh is posited by Meadow on the grounds that there are bones of all three animals in the early levels that are morphologically and metrically identical to the bones of the (certainly) domestic species in later periods of occupation, alongside (in both cases) the bones of much larger animals that are assumed to be wild. The main stock were sheep and goats, though cattle would have provided as much meat, the mortality data indicating that most of the livestock was killed as it attained full growth. Further evidence that domestic sheep and goats were being kept by the community consisted of their hoof imprints in the clay floors. The gazelle/goat mix in this first phase of occupation is reminiscent of many PPNA sites in South-West Asia (207)

In the succeeding phases of Neolithic occupation, the role of game in the diet consistently decreased and zebu came to be the major livestock. The amount of meat being produced from the zebu herd suggests that the large communal buildings may have been used as centers for storing meat and distributing it to the community. An important trend is morphologically and metrically identical to the bones of the (certainly) domestic species in later periods of occupation, alongside (in both cases) the bones of much larger animals that are assumed to be wild. Another trend observed was a changing relationship between sheep and goats: goats were more numerous than sheep in the basal levels, then sheep became far more numerous than goats, but in the later levels the numbers of sheep and goats were roughly equal. At the same time, the size of cattle and sheep diminished rapidly, whereas goat size remained relatively stable. Meadow concluded that fully domestic goats were present at Mehrgarh from the outset, whereas the process of domesticating cattle and sheep was still in train through the initial phases of occupation.

Interestingly, one of the earliest burials at Mehrgarh was of an individual laid to rest with a sickle by the head and the body of a goat at his or her feet. The grave-goods of another prestigious individual buried *ca.* 5500 BC included a bracelet of copper beads, one of which contained a piece of cotton. Cotton has usually been thought to have been domesticated in the Harappan period, and its appearance in Neolithic Mehrgarh is yet another indicator of the innovative and distinctive nature of the early practice of the Eurasian farming system in this part of South Asia.

Like the plant and animal husbandry systems, the harvesting technologies at Mehrgarh were distinctive with respect to those of South-West Asia. The technology included geometric microliths such as those used by the late Pleistocene and early Holocene foragers of the Zagros and Turkmenistan. Although it is normally assumed that these were armatures for arrowheads, some of them in the first level at Mehrgarh had silica gloss indicating that they were being used in this instance as sickles. Furthermore, although 'normal' sickle blades were also found, including ones with traces of bitumen attached to them, they were much rarer than microliths with sickle gloss. This unusual

preference for making sickles out of microliths (presumably they were set saw-edged into wooden or antler handles), rather than parallel-sided blades as in South-West Asia, became more common over time. The Mehrgarh community also used polished axes and adzes, stone bowls, perforated stones that are probably the weights for digging sticks, and asphaltcoated baskets.

In short, though the house architecture and cemeteries bear some resemblance to those of PPNB settlements in South-West Asia, there were significant differences in the nature of the farming systems practiced, and the technologies used. In combination, the evidence suggests that it is at least as reasonable to interpret Mehrgarh in terms of a separate process of domestication taking place in this part of South Asia, in parallel with that of South-West Asia, as it is to accept the orthodox assumption that Mehrgarh agriculture must automatically be regarded as an offshoot of South-West Asian agriculture, an eastwards colonization of PPNB farmers from the Zagros or some kind of acculturation process. This reading of the data chimes with the study by Loftus *et al.* (125) of mitochondrial DNA in modern cattle. Their analyses of degrees of genetic similarities and differences between six European taurine breeds, three zebu and one taurine breed from Africa, and three zebu breeds from India, concluded that the African and European cattle were from one lineage but that Indus cattle were quite separate, with a divergence date at least 200,000 years ago. This clearly implies separate domestication events for the different subspecies of *Bos primigenius*, including the Indian *Bos namadicus*. The work of Hanotte *et al*. (211) points to the initial domestication of zebu cattle in the Indus Valley. The evidence for communal food storage, elaborate ideologies, and positions of authority in Mehrgarh society also suggests that the site is unlikely to represent the initial stage of agricultural practice in Baluchistan.

Farmers, Herders, and Hunters: ca. 6000-3000 BC: By the sixth and fifth millennia BC, agricultural villages were widely dispersed throughout eastern Iran, Turkmenistan, and Baluchistan (67,212,213,214).There are increasing signs of social hierarchy, the production and control of surplus foodstuffs, specialized craft production, and longdistance exchange. Mehrgarh, for example, has large central storage buildings at this time, and evidence of specialized crafting zones for working hides and making wheel-made pottery, bone tools, and beads from the marine shell *Fascolaria trapezium* and from semi-precious stones. Signs of intensification in the agricultural system include an increasing reliance on cattle-herding, the use of a wider range of cereals than in the initial phase of settlement, and the beginnings of viticulture and possibly the cultivation of cotton *(Gossypium)* as well. Most of the cattle, sheep, and goats were now killed well before they matured, presumably for their meat.

Copper metallurgy was gradually incorporated into systems of production and regional exchange, and by the later fourth millennium there were porto-urban societies in the Indus valley and Baluchistan presaging the Harappan Civilization (215,216,217). The range of crops at pre-Harappan Balakot is much like that of the upper levels at Mehrgarh, and the killing ages of cattle, sheep, and goats were also similarly young (10). Crude humped bull figurines at Balakot and Mundigak (Afghanistan) clearly represent zebu cattle. The range of crops suggests that the double-cropping system of traditional farming in Pakistan had now begun, with winter *(rabi)* cereals and pulses and summer *(kharif)* crops like cotton and grapes (79).

The spread of agriculture has traditionally been interpreted in terms of the spread of people, agricultural colonists (60). In the Indus context the thesis has been supported by the linguistic argument that the Dravidian languages must have developed from a people migrating from eastern

Iran and speaking proto-Dravidian. Most Dravidianspeaking peoples today are farmers or pastoralists, and Zvelebil (218) argued that there were signs in their languages that they once must have been mountain or hill people. Such a thesis fitted neatly with the orthodox archaeological models of a Neolithic colonization (ultimately from South-West Asia across the Iranian plateau) from the uplands of Baluchistan into the Indus valley and thence into the Indian sub-continent (219). The Neolithic-protoDravidian colonization model has of course many parallels with the 'farmer-colonist' models that have been proposed to account for the development of Indo-European languages in Europe, Bantu languages in Africa, and Austronesian languages in South-East Asia.

However, the increasing complexity of the archaeological record poorly fits such a model (220,221). As forager societies came into contact with farmers, some incorporated aspects of the 'Neolithic package' into their lifeways, others resisted it. The evidence implies a prolonged regionwide situation of inter-communication: not diffusion from a single major centre, for which there is no evidence whatsoever during the period considered; not parallel cultural evolution without mutual contact but something more complex and fundamental than either of these somewhat over-simplified and overworked concepts' (222).

Interaction Spheres and Supra-regional Networks: Before we close this survey, mention should be made of relevant paper by Trevor Watkins (185), *Supra-Regional Networks in the Neolithic of Southwest Asia*. This may serve as a supplement to the above discussion and deepens our understanding of the interconnectedness of Middle Asian region, proposed in this section. This may also provide a theoretical cover over much of what we may already know or discussed in the above.

Within the Levantine context Bar-Yosef (223) alluded to the idea of an interaction sphere as an alternative to the outmoded model of the isolated archaeological cultures. The interaction to which the authors refer consists in substantial and regular economic exchange relations between settlements in the Mediterranean core zone, reliant on crop cultivation and herding, and culturally related huntergatherer groups inhabiting the semi-arid zone.The special feature of the original idea of interaction sphere, attributable to Joseph Caldwell (224), however, is the interpretation that the common symbolism and world view was spread, not by the expansion of some people who carried that package of knowledge, ideas and beliefs with them, but by the power of the ideas and symbols that attracted societies over a wide area to participate in the exchange network and share symbolic values.

If we discard the old ‘cultural groups’ (and with them the old diffusionist, core-periphery model that is assumed in the Levantine primacy hypothesis), we can start again from the level of the settlements that archaeologists have been sampling with their excavations throughout the Fertile Crescent and beyond. There has been interesting work in recent years on the social organization of sedentary Neolithic communities and the households of which they were composed. It has been clear for some time that in order to function coherently the larger Neolithic settlements must have had some kind of internal structure, intermediate between the basic family or household unit and the totality of the coresident community. At one level, in the smaller communities, the household may have been the basic unit of social organization. The larger communities would certainly have needed another layer of structuring between the household and the overall community of several thousand people. Thus, we may observe that there are one or two layers of social organization to be inferred below the level of the co-resident community represented in the excavated settlements. These constitute nested networks of cultural, social and economic interaction.

Trevor Watkins (185) proposed that what we see in the early Neolithic in southwest Asia, at least in the western half of the 'hilly flanks' zone, is the emergence of the first local and regional peer polity interaction spheres. With the passage of time, there emerged out of these primal interaction spheres a powerful, supra-regional peer polity interaction sphere. This capacity to build and maintain communities that were larger than the circle of immediate kin was necessary in order for early Neolithic groups to live together, for the first time in human history, in co-resident groups of several hundred or several thousand people in permanent settlements. Symbolic culture and minds capable of operating with systems of symbolic representation were essential for the formation and maintenance of communities in which notions of trust and the ability to detect 'free- loaders' were vital.

Trevor Watkins (185) set out to show that there was much archaeological evidence for exchange and interaction of the kinds defined by Renfrew as characteristic of a peer polity interaction sphere. There are hard archaeological indicators of exchange of goods and materials, and of the sharing of cultural practices in the early Neolithic of Southwest Asia, especially in the better investigated parts. Similar indicators, we are sure, could be found in other parts of the Old World. Beyond thinking of these phenomena as evidence of trade or social exchange, we can see them as surviving indicators of extensive networking.

The best documented example of networking is the exchange of obsidian from central and eastern Anatolia through much of the rest of Southwest Asia. Renfrew distinguished two kinds of use of obsidian. He showed that aceramic Neolithic communities within two or three hundred kilometres of the sources in central and eastern Anatolia depended on the supply of obsidian, which they used for at least 80% of their chipped stone needs. It was critical to their economic functioning. Outside the zone in which settlements supplied their basic economic needs for chipped stone from the obsidian sources, there was a much more extensive zone where percentages of obsidian declined more or less exponentially with distance from the sources. From the central Anatolian sources, obsidian was spread to Cyprus, Cilicia and throughout the Levant, almost as far as the Gulf of Aqaba. Obsidian from the eastern Anatolian sources is found through the Anti-Taurus piedmont, across north Mesopotamia, and down the Zagros valleys and piedmont at least as far as southwest Iran.

There were other artifacts and materials of low functional significance in the material economy that were exchanged, notably marine shells from both the Red Sea and the Mediterranean. Red Sea shells were exchanged at least as far north as northern Syria, and Mediterranean shells that are found on many inland sites in the Levant occur also on sites in the center of Anatolia. In the Levant, vesicular basalt for use in pounding and grinding implements, and various kinds of attractive stone used for making personal ornaments, were exchanged over considerable distances. While the stone is very good for use in querns, mortars, pounders and rubbers, it is very dense and heavy, and its transport by humans over tens of kilometers is an extravagant use of energy.

The distribution of female human figurines in a wide geographic zone is of important significance: it suggests the existence of an important Neolithic substratum of which one gets a glimpse at Mehrgargh, but which is present elsewhere, as shown by an 8th millennium figurine from Mureybett III in Syria. limestone with incisions, rather close with its plain appearance to the first clay figurine of Mehrgarh with its belt. Comparable items in clay are found at Zaghe in Iran in the 7th millennium and, in stone, at Zeitun in 6th millennium southern Turkmenia.

These sitting and standing figurines which are present at Neolithic Mehrgarh can be found as well in

Yalangach, Turkmenia in 4th millennium BC, at Kara-Tepe (Namazgah III) in 3000, and closer to Mehrgarh in Gomal area of Pakistan in 3000 BC and Sarcasm in Tajkistan, around 3000 BC. They are also found during the third millennium in faraway places as at Mundigak and Shahr-e-Sokhta though in those levels - Mundigak III and IV and Shahr-e-Sokhta II and III, contemporary with Mehrgarh VII - these figurines, whose Neolithic origin is still closely visible, are found along with other figurines of the Mehrgarh VIIIB type.

Links can also be established between Mehrgarh VIIB and some Indus type figurines and between Nousharo I, II and Nousharo III, complimentary with comparable figurines from Harappa. Through these examples, one can see Mehrgarh Period I until its end ca. 2500 BC and even in some instances during the Indus Civilization, the early figurines of Mehrgarh are an essential component in the vast geographical zone which extends from Central Asia to the Zagros, whose ramification will reach even further during the second millennium BC. If these figurines represent some sorts of symbols, then these symbols circulate through the same exchange network as raw materials, technology, funerary practices, agricultural crops, domesticated animals, and reveal the links, the contacts and the exchanges by the Zagros flanks, Baluchistan and the Indus, the Kara Kum desert and the Makran coast.

Evidence of a different kind of networking is the practice of sharing technology. In the later aceramic Neolithic, it became common over a very large part of southwest Asia for people to use a particular and peculiar reduction strategy. It takes variant forms, but in essence it involves forming cores that can be struck from either end - bipolar cores. Flakes or blade blanks were then struck alternately from either end of the core. For reasons that cannot be explained in terms of changing technological demands, people wanted larger tools, and particularly larger projectile points. In southeast and central Turkey, an alternative reduction technique was used, especially on obsidian - the so-called bullet core, producing exceptionally narrow, thin and long blade blanks, very similar to those common in the Indus Valley.

Archaeologists have noted particular architectural designs of houses that are shared across a number of sites. In parts of the southern Levant in the later aceramic Neolithic, the pierhouse is common, its walls and floors often finished in thick lime plaster, which might be colored and burnished. In southeast Anatolia, settlements had very large and substantially built houses, constructed in mud brick on stone and mud mortar foundations. At one time, the stone and mud foundations consisted of a series of square cells; at another time, they consisted of closely set parallel walls. It appears that the sequence of architectural changes - from grids to sleeper walls - is replicated at different sites across the region. These stereotyped regional house types were built to quite elaborate designs, which suggest that their forms, construction methods and finishes were culturally constrained rather than driven by simply functional needs for shelter.

The hundreds of human burials and the caches of human skulls, especially the plastered skulls, from Jericho surprised everyone in the 1950s; the practice of intramural burial among the houses, and the retrieval and curation of skulls, became a key cluster of traits in the early formulation of a PPNB culture. Excavating on other settlement sites of the same age, archaeologists soon began to record the same or very similar phenomena. The complex of cultural traits associated with the burial of dead bodies and the curation of detached human skulls began to be called a ‘skull cult’. In fact, there is a lack of systematic regularity; the generalities apply through the Levant, but what has been found at one site is not quite the same as what has been found at others. Indeed, a very variable range of practices can be found at a single site, and even within a single funerary complex, as recent work at

Tell Aswad shows. The same degree of variation is evident at Mehrgarh.

Conclusion: The evidence for the beginnings of farming in Iran, Central Asia, and Baluchistan lacks in precision compared with the Near East. There are very limited data on the course of landscape change between, say, 15,000 and 5,000 years ago, and in most parts of this vast region we have little understanding of how people were living in the closing millennia of the Pleistocene and the opening millennia of the Holocene. Discussion of agricultural transitions throughout this vast region is hampered by poorly dated sites, and problematical identifications of wild and domestic cattle, sheep, goats, and plants.

The development of 'Eurasian' systems of farming may *possibly* - be later in Turkmenistan and Baluchistan than in South-West Asia, or they *may* be broadly contemporary with PPNB sites in South-West Asia. The PPNB sites in South-West Asia, were part of a long process of subsistence change that was primarily focused in the uplands, but equivalent upland regions in Central Asia such as Afghanistan are very poorly researched. What is also particularly striking about early farming in Turkmenistan and Baluchistan is that it was distinctive and different from contemporary PPNB farming systems in South-West Asia, not simply an extension of it. Also, the modern distributions of wild species of cereals, sheep, and goats can only be taken as a general guide to their distributions at the beginning of the Holocene (to say nothing of where they were in the closing millennia of the Pleistocene). There is, therefore, a strong possibility that there was a series of parallel early domestication stories variously affecting components of what was to become the Eurasian system of agriculture and located variously between the Levant in the west and the Hindu Kush and Baluchistan uplands in the east - a vibrant example of an ‘interaction zone’. We shall examine this thesis in the followings.

THE CASE OF THE EXPANDED NUCLEAR ZONE

We start with the proposition that there is no clear geographical and ecological boundary between the Levant and Baluchistan or for that matter between southern Turkmenistan and the rest of the region. Western Asiatic land forms - mountain ranges, alluvial valleys, semi-arid steppe, and desert - extend eastwards from the Iranian plateau beyond the Caspian Sea into Turkmenistan in Central Asia, and there are similar environments in Baluchistan and the Indus valley. We consider this general area as one interconnected region and look at the issue of the domestication of plants and animals as well as the spread of agriculture and pastoralism from this vintage point of view.

It has been clear for many years that the wild progenitors of the plants and animals on which Near Eastern, Indus Valley and Central Asian civilizations are founded are quite widely distributed. The animals (sheep, goats, cattle) and plants (barley and possibly wheat) are all found in the uplands

of the area ranging east from the Mediterranean Sea, between the Persian Gulf and the plains of Central Asia (see map). The region is dominated by the Zagros mountain range, Iranian Plateau, and the Hindu Kush. This region between the Indus River



Graeme Barker
The Agricultural Revolution in
Prehistory, 2006

and the Mediterranean Sea, the Persian Gulf and the deserts of Central Asia where the ranges Braidwood's constellation of potentially domesticable plants and animals overlap, can be seen as a vast interaction sphere in prehistoric times. This is the 'expanded nuclear zone' for



Gregory L. Possehl *Indus Age - The Beginning, 1999*

Near Eastern, Iranian, Central Asian, and the Indus Valley domestication.

The domestication of those plants and animals of which Near Eastern, Central Asian, and the Indus civilizations were founded, took place in the zone proposed here. Interaction within this zone may have been so intense and regular that it will be found that there is no predominant early center of innovation within it; the ideas and products of early experiments with plants and animals having been rapidly disseminated within the interaction sphere (5). The forces of culture change and adaptation were regional, rather than local (Near Eastern, Indus, Iranian, Caspian, Afghan, etc.). Rich communication and the prolific sharing of ideas and products was an essential ingredient in this process of culture change throughout this vast region. A useful, productive, successful innovation in one place could be quickly adopted elsewhere. Many small, some grander, innovations took place in numerous parts of the expanded nuclear zone, with no single region emerging as a clear and consistent "leader" in the process, at least over the time scale used in prehistoric archaeology.

If we set aside some of our assumptions, some of which might even be characterized as preconceived notions, this story might be seen as a good deal more interesting and varied than is presently thought by some. For example, it might be found that wheat was an early domesticate in one region and that some other plant, or plants were being used elsewhere. We might discover that the domestication of

animals took place more or less simultaneously throughout the expanded "nuclear zone" but that the domestication of plants has a different history. These, and many other possibilities, are raised here to challenge the notion that there was a food producing ‘revolution’ in the Near East that ended with settled life and encompassed the domestication of Braidwood's ‘constellation’ of potentially domesticable plants and animals. A further challenge goes to the notion that this integrated way of life, "the Neolithic village", subsequently diffused or spread into the Greater Indus Valley, Afghanistan and Central Asia. The motivation for these challenges comes from a deep sense that they are too pat, simplistic in the extreme. As Possehl has stated (5), the research has reached a point where self-fulfilling hypotheses may be affecting the outcome of archaeological work. There is far too much concern with demonstrating the early domestication of plants and animals, or the special genetic resources of the Near East, than with the evenhanded testing of a proposition.

This proposition holds some attractive alternatives to current approaches. For example, the polarities that characterize some of the discourse on the topic of early food production and domestication in the Near East and Baluchistan fade away. There is no need to· imagine a Near Eastern as opposed to a Baluchi center. The linked and somewhat turgid notions of "diffusion” and "independent invention" also fall by the wayside, replaced with considerations of communication, the sharing of ideas and richly endowed, broad based networks of interaction of the kind referred to above.

This new approach to the question of the ‘origins’ and spread of agriculture in the Near East, Central Asia and Pakistan seems to be a sensible one. It satisfactorily explains the commonality of crops and herded animals throughout the region and provides us with a rational basis for the spread of the regionally-differentiated Neolithic cultures without stretching the forces of diffusion to a breaking point. More importantly, it makes the chronology of the process of cultural development more palatable. There are some archaeological and ethnobiological evidence to support this hypothesis but wide gaps still remain. For example, while we have an unquestioned evidence for a aceramic Neolithic settlement of Mehrgarh in the Kachi plain in Baluchistan during the 8^{th} millennium BC, we nevertheless still have to find a site to match the huntergatherers’ Epi-paleolithic settlement of the Natufians in the Near East almost a millennium ago. Similarly, while we have strong archaeological evidence for early agricultural settlements in southern Turkmenia and northern Afghanistan, we do not have any evidence there for an aceramic settlement of the age of Mehrgarh.

In common with other major cultural areas in prehistory, the Greater Indus Valley has been constantly influenced by external forces, as a result of invasions, migrations, trade and diffusion of ideas and technology. In any or all of these ways, at different times, the cultural structure and development of this land has been interrupted, stimulated, enhanced or otherwise influenced. In global terms this can be seen as part of an ongoing process of cultural cross-fertilization whereby major cultural entities continually influence one another. The tension and balance between internal cultural development and external influence is complex and subtle, and it is something a student of prehistory needs to keep constantly under review in trying to understand the past. The two processes, internal development and external influence, are also apparent on a smaller scale between regional cultures and a major culture, as will become clear when we look more closely at the internal character and cultural history of Baluchistan, Sind, Punjab, and the Pashtoon country.

Regional differences and commonalities between the areas commonly identified as the Near East (or South-West Asia), Central Asia (including Afghanistan) and the Greater Indus Valley (including Baluchistan and the Pashtun country) and their development with time are the key to appreciate the

concept of an expanded nuclear zone during the inception and spread of agriculture and animal herding in the vast area under consideration. A rather detail overview has been provided at the beginning of this chapter which, when read between the lines, clearly shows a vast integrated area of common cultural traits and comparable technologies, interconnected by long distance exchange systems and documented by the presence of marine shells, lapis lazuli (found in Afghanistan and Baluchistan) and turquoise (Iran and Central Asia), noted by Richard Meadow and others. The people of Mehrgarh were not isolated 'home bodies' unaware of the world around them, especially the world to the north, south and the west - the other parts of the "expanded nuclear zone."

There is a good case to be made that the people of Mehrgarh were participating in the early stages of the food producing/domestication revolution. The strong evidence for local involvement in the shift of the animal economy from hunting to herding and the participation in interregional communication give us good reason to believe that further work in the region around Mehrgarh and southeastern Iran will tend to support the hypothesis put forth here: there was a single "expanded nuclear zone" in Middle Asia within which food production and domestication took place within a single period of time; from about 11,000 BC to 5500 BC. In the Near East this would encompass the period beginning with the Natufians through PPNB.

Over this period of time the peoples within the "expanded nuclear zone" (at least many of them) were experimenting with their subsistence economy, seeking ways to better control the vagaries of production through the husbanding of animals and the management of plants. These experiments were many, some successful and of these successes some more successful than others. Seen in hindsight some must have been failures, possibly devastatingly so in some cases. The communication within the "expanded nuclear zone" was generally rich. This was driven in many ways. Some of these would have been a) trade in material goods, raw materials and finished products, b) the presence of marriage and other social networks such as systems of exchange founded in reciprocity and ecological machineisms for spreading risk and forming alliances, c) the maturation cycles of plants and animals, new patterns of movement and communication implied by the emergence of food production and domestication. The richness of this communication, and the diversity of these mechanisms of antiquity, are, of course, poorly documented today; but there are hints, there is an underlying logic, there is enough for an hypothesis to be put forward that has sufficient substance for it to be tested, rather than dismissed.

The well-told story of the origins of agriculture in the 'core area' of the Levant and is dispersal to the East and the West as well as to the North and the South is a coherent narrative, backed by some archaeological evidence and a hefty doze of conjecture. The evidence for the 'expanded nuclear zone', advocated here, is however, slim. All we have are the questions that the 'core-periphery' paradigm fails to answer. For example, questions are raised by the two Ak-Kupruq cave sites in Afghanistan. Although these sites have yielded few radiocarbon dates and have not had their faunal and floral remains properly analyzed to modern standards, they may contain domesticated sheep and goats in aceramic levels that could date between 8500 and 7000 BC, or even earlier if one focuses on the tails of radiocarbon probabilities. Ceramic levels begin *ca.* 6000 BC, in line with other parts of Central Asia as well as with evidence from Mehrgarh. These suggestive, but problematic sites, taken together with problems surrounding the beginnings of Mehrgarh, both in terms of dating and in terms of precursor sites in the region, are significant. A parsimonious explanation for origins would posit the dispersal of goats (and perhaps sheep), wheat and barley (and perhaps pulses and linseed), to Baluchistan in the seventh millennium, which sets off the food-producing revolution in this region

where additional animals (especially zebu cattle) and crops (notably cotton and eventually sesame) were domesticated. It was this package, along with a largely Southwest Asian fair, that formed the subsistence base of Harappan urbanism.

Braidwood is rightly credited for placing the wild progenitors of plants and animals at the center of their early domestication. Focusing the search on such habitats, whether it is his Near East constellation, the millet areas of Africa, the corn/bean/squash regions of the Americas, or the western parts of Pakistan, makes good sense but presents a problem that has not been addressed adequately. The modern distribution of these wild ancestors cannot necessarily reflect the distribution of the same species in the early Holocene. Thus, the presence of wild barley and wheat in South-West Asia does not necessarily mean that these plants were first domesticated there. In the case of both these cereals, whilst the presumed wild ancestors are certainly found in the 'hilly flanks' of South-West Asia across an area measuring some 1,500 kilometers at the furthest extent of the arc from west to east, their modern distributions in fact extend considerably further to the west and the east, in some cases by two or three times that distance. In using DNA fingerprinting on einkorn and emmer (respectively) to try to identify where they might have been domesticated, Heun *et al*. (225) and Ozkan *et al*. (226) assumed that their current biogeographical ranges must encompass the location of their domestication (which they fixed to the Karacadag mountains of south-eastern Turkey), yet as G. Jones *et al*. (227) point out, we might expect domestication to have greater value at the edge of a species distribution, or outside its range, than at its core. Some of the presumed ancestral species may not even be ancestral anyway: the relationships between the modern wild populations of sheep and goats are much less clear than those between the wild and domestic cereals, for example, and some populations may well be feral, once-domestic stock that escaped and reverted to the wild (25).

In large part, due to the density of research in the Middle East, archaeologists are beginning to come to grips with the problem there, but it has been a major research effort, involving a massive amount of work. In the case of Pakistan, and for that mater that of the neighboring Afghanistan and southeastern Iran, such an organized research effort has never been done. It is only in very recent years that a picture has started to emerge in which Baluchistan and western Sindh seems to be playing a role of a major “nucleus” for the propagation of agriculture and domestication at par with the Middle East. In fact, it appears that Pakistan’s role in diffusing certain aspects of agriculture and animal husbandry to its west and northwest on one hand and to its east on the other may be more significant than believed so far.

Hence, whilst the Near East is the area classically defined as the place where farming first began in the Old World, it is important to recognize the dangers of circularity: farming has been presumed to have been earliest here, so most research has taken place here. Indeed, in recent decades political considerations have meant that relevant research in South-West Asia has been even further concentrated within a very few locations such as the Jordan valley and its environs in Israel and Jordan, the Syrian steppes, and central and western Turkey, with Lebanon, the West Bank and Gaza, eastern Turkey, Iraq, and Iran effectively closed to fieldwork. Pakistan and Central Asia, although hospitable for such a research, somehow does not excite the curiosity of archaeologists any longer. Yet as Bender pointed out almost fifty years ago, one can accept that there is an important center in South-West Asia where many potential domesticates exist, but to confine the search to this center may distort the attempt to understand the processes involved in the gradual shift to food production. If archaeologists researching the beginnings of the Eurasian system of mixed farming (the mix using wheat, barley, sheep, and goats, as well as legumes, cattle, pigs, and so on) had really followed their

oft-stated logic of following the modern distributions of the supposed ancestral populations, they should have been working equally from the eastern Mediterranean to the Himalayas. Indeed, as the foregoing chapters of this Section makes clear, the evidence from Central Asia and Pakistan is providing intriguing indicators that transitions to farming there may also be of great antiquity. We need to approach the evidence for the beginnings of cereal and sheep/goat farming, therefore, in the knowledge that most of the best evidence comes from a few 'hot spots' of active research in South-West Asia (25).

Botanical surveys in the twentieth century indicate that wild barley is found in Baluchistan. There is no direct evidence for wild wheat in Baluchistan or Afghanistan although these regions are environmentally the sort of places with which wild wheat could have been associated. The ecology of Baluchistan is much like the Near East. Both are forest steppes with similar tree cover. They also share the hard, cold winters in which wheat and barley evolved. We know that Baluchistan is home to wild cattle, sheep and goats, as well as pigs. So, these genetic resources were present in this region. The presence of wild barley in the region, and the nature of the environment suggest that wild wheat may have been there at the opening of the Holocene and disappeared through environmental degradation and change. The modern distribution of these plants, and others, may not accurately reflect the distribution 10,000 years ago.

If wild wheat was not present in the IndoIranian or Pak-Afghan borderlands, this region could still have played a key role in the domestication process. The genetic history of free threshing wheats, those most useful to humans, involves genetic crosses with the genome *Triticum* and with a related plant, goat-face plant, found all across the Iranian plateau, including its eastern parts, namely, Baluchistan. Richard H. Meadow has made the point that wheat could have originated as easily in Baluchistan as in northwest Iran, and it seems quite likely that free threshing wheat of the Near East was *T.turgidum* and that of Baluchistan was *T.aestvivum.*

Baluchistan as a center for domestication of plants is an old concept, going back to the famous Russian botanist Nicole Vavilov. Lorenzo Constantini and Loredana Costantini Biasini have made quite an interesting observation that is pertinent to the present discussion of the genetic resources of Baluchistan, for the promotion of the domestication of plans and the establishment of early village farming communities. They include the Baluch territory, physiogeographically speaking, in the ArmenoIranian province of the eastern Irano-Turanic subregion. The vegetation of these territories is characterized by plant associations in which Baluchistan represents a transition zone between thickly growing juniper forests of the steppe and sparsely growing small trees and bushes of the slopes. Such a region is ideal for the growth of a variety of grasses, including barley and wheat. As Jean-Francois Jarrige has observed, it may indicate that Baluchistan, possibly including the hilly slopes of the Pashtun country, might have been part of a large geographical area within which the wild progenitors of potentially domesticable plants would have been found. These are characterized by the additional presence of pistachio, almond and juniper as significant elements of a steppe-forest in a climate with hot, dry summers and cold, wet winters.

Jean-Francois Jarrige remarked: "...in the past a Mediterranean type of vegetation could have descended to the base of the Balochistan piedmont. In any case, it is clear that the vegetation cover of the Bolan Basin has evolved through time. One can now no longer eliminate the possibility that this region had an herbaceous cover in the past very different from that of today, including, in particular, the wild cereals, specimens of which we find in the deep levels of the neolithic. The existence of such

a vegetation cover could have provided the milieu for mutations and spontaneous hybridizations among various cereals. The presence of small amounts of bread wheat or of sphaerococcoid wheat and barley could be explained as being their weeds in the fields of barley with still only slightly domesticated characteristics" (102).

The above discussion is not to prove the priority of one place over the other for the 'origin' of agriculture and domesticated animals. It is merely to show that the primacy of the Near East for the origins and spread of the Neolithic culture should not be taken for granted and even the 'revolutionary' character of this change should not be subscribed to without the examination of the relevant evidence. Given the predominance of evidence in favor of the Near east at the present time and given a severe lack of research in Iran, Afghanistan, Central Asia and Pakistan, the fact remains that the essence of the farming economy has a whiff of South-west Asia. Another way of looking at the situation is to consider the whole area ranging from the Mediterranean to the Indus Valley and from the Levant to Central Asia as one interaction zone in which people of different sub-regions freely interacted with one another, exchanging goods and ideas. This exchange also applied to the methods of agriculture but also to the exchange of seeds and stock animals. Under this scenario, we are in fact dealing with an 'explsanded core area" expanded to an extent that one wonders what is the 'core' and what is the 'periphery' (5).

Conclusion: Vast gaps remain in our knowledge of early agriculture and pastoralism in Pakistan and the surrounding region to its west, but a provisional synthesis of much of what we do know suggests that we are observing a more unified phenomenon than is often supposed. What does *not* emerge from the evidence we have is a picture of multiple independent foci of agricultural beginnings at diverse times and places. The data also negate the primacy of a 'core area', such as the Levant or Baluchistan where agriculture originated and from where it spread to other regions like a wave of propagation. On the contrary, the evidence best fits a model of a vast, fully integrated region of more or less similar environment, in which pristine transitions to agriculture, in the sense of dependence on the systematic cultivation of (mainly) domesticated crop plants, took place. For the lack of a proper name, Possehl has called this region the "expanded core area" which is geographically equivalent to the Middle Asia, spanning from the eastern shores of the Mediterranean to the Indus Valley and from the hilly flanks of the Zagros mountains to the northern slopes of the Elburz mountain range in southern Turkestan. This is approximately the area that constitutes the Iranian Plateau in its entirety. It is possible that most of the action took place on the outer slopes of this highland.

There is no clear boundary between the Levant and Baluchistan or for that matter between southern Turkmenistan and the Zagros. Western Asiatic land forms - mountain ranges, alluvial valleys, semi-arid steppe, and desert - extend eastwards from the Iranian plateau beyond the Caspian Sea into Turkmenistan in Central Asia, and there are similar environments in Baluchistan and the Indus Valley (25). The most parsimonious interpretation of the available evidence suggests, first, that seed-crop agriculture based on cereals and pulses developed in this area during the eighth millennium BC, with the raising of domesticated cattle, goats and sheep. As far as Pakistan is concerned, this suite of crops and animals was later supplemented by another package that includes seed-crop agriculture based on millets and rice, with domestic pigs and chicken, developed in East Asia, probably first in the basins of the Huanghe and Yangzi rivers, by, or possibly before, the mid-seventh millennium BC (whether separately in these two parts of China or as part of a single developmental process there we do not at present know). These crops and animals arrived here most likely during the third millennium BC. A few crops, mostly pulses and vegetables, arrived from India as well.

This interpretation leads to a second general conclusion: that diffusion was the dominant process by which agriculture and pastoralism became established throughout the region. How far this was the result of colonization by agricultural populations (demic diffusion) and how far it depended on the adoption of crops, domestic animals and agricultural techniques by hunter-gatherers remains a controversial question, but, in general, the evidence suggests that a cultural creep rather than an expanding populations of seed-crop cultivators and their migration to the areas inhabited by huntergatherers were mainly responsible for the spread of agriculture.

IV. References

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***izkX/kkjk] vad & 18*SECTION VI**
SECTION V

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Focus on Mehrgarh

Fig.1 : Map of prehistoric sites in the North of the Indian subcontinent. © Encyclopedia Universalis VI.1. Mehrgarh - an Early Agricultural Community V.2. Subsistence Economy VI.2. Subsistence Economy

Fig.1 :

V.3. Technology and Crafts

extensive plans, including the 46 buildings which
Map of prehistoric sites in the North of the Indian subcontinent. © Encyclopedia Universalis
Neolithic settlement) has been extended to a total

V.4. Architecture VI.3. Technology and CraftsVI.1. Mehrgarh - an Early Agricultural Community

VI.1. Mehrgarh - an Early Agricultural Community

VI.4. Architecture
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VI.7. References
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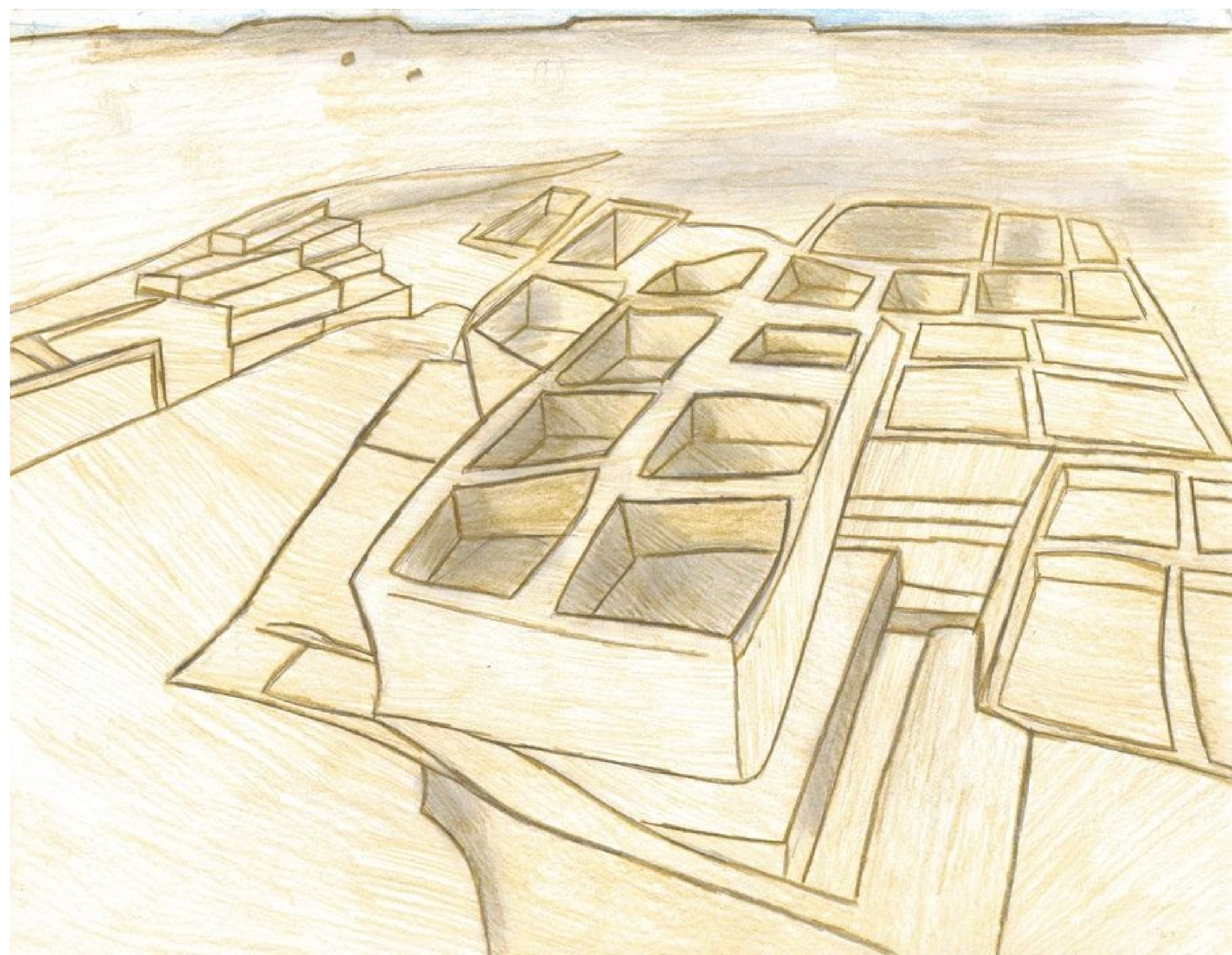
V.0. Focus on Mehrgarh


Jean-Francois Jarrige

Mergearh is one of the most important Neolithic sites in Pakistan. It lies on the border of Sindh and Baluchistan in an area that is commonly known as the Kachi plain. It is one of the earliest sites with evidence of farming (wheat and barley) and herding (cattle, sheep and goats) in South Asia and it is the only site to have revealed a long and continuous sequence that spans from the very beginning of agriculture and sedentary living in Pakistan to the emergence of a vast Bronze Age urban civilization in this part of the world. The story of Mehrgarh is, therefore, the story of the neolithic Pakistan itself.

Mehrgarh has been superbly excavated by the French Archaeological Mission during 1970s and 1980s under the direction of Jean-François Jarrige. The work at Mehrgarh has enabled a complete re-evaluation of the archaeology of the Greater Indus Valley and has provided us with a window to the spread of agricultural settlements in the early Holocene. Mehrgarh is now rightly seen as a precursor to the Indus Civilization. Because of its monumental importance in elucidating the beginning of agriculture and the Neolithic culture in Pakistan, Mehrgarh deserves to be the focus of our special attention. We, therefore, devote a full Section to this site.

V.1. Mehrgarh - An Early Agricultural Community



Mehrgarh has already been discussed at several places in the foregoing pages in connection with the beginning of agriculture and the advent of sedentary living in Pakistan. The beginnings of early Neolithic in South Asia, that

is, the emergence of settled life, farming, and animal herding, were for many years best documented at the well-known site of Kili Gul Mohammad in the Quetta Valley, Baluchistan (1,2) but its history did not go beyond 4000 BC. The excavation at Mehrgarh pushed this date to seventh, probably even to eighths millennium BC. In this respect, Mehrgarh emerged as the most important neolithic site on the eastern margins of the Iranian Plateau and proved to be an open window to the study of early neolithic of Pakistan.

The work in Afghanistan, at the sites of Ghar-i-Mar (3,4) and Ghar-i Asp (5,6) sheds some light on the domestication process in this region and gives archaeologists reason to suspect that this way of life had its beginnings in this general area in the early millennia of the Holocene. While much needs to be done to confirm the Ghar-i-Mar and Ghar-i Asp data, which suggest that food production began in the region at *ca*. 8000 BC, its confirmation comes only from Mehrgarh. It is a large site covering in excess of 200 hectares, although the gross extant of the mound is not an indication of the population size associated with it.

Mehrgarh is located in northern region of the Kachi plains, at the foot of the Bolan Pass (29°25′ N, 67°35′ E). Here the Bolan river enters the plains and now cuts the ancient settlement. The excavated site spans a time from the beginning of the eighths millennium to the middle of the third millennium BC. So far this is the only site which has revealed such continuous sequence of cultures in South Asia and first time established a deep antiquity of the Neolithic in the Greater Indus Valley (7). The discoveries at Mehrgarh provides us with an opportunity to study the progression of cultural change in at least this geographic region, if not in the Greater Indus Region generally. They illustrate the development in subsistence patterns of the region as well as its craft and trade specialization. On a broader scale, it is here that the village farming community begins in the seventh millennium B.C., if not earlier, and it is here that the foundation of the urban phase of the Indus Civilization is laid. This framework makes the detailed study of Mehrgarh extraordinarily imperative.

The archaeological sequence at the site of Mehrgarh is over 11 meters deep. The site represents a classic archaeological tell site, that is, an artificial mound created by generations of superimposed mudbrick structures. Its excavators have proposed the chronology summarized in the following table.

The earliest Neolithic evidence for occupation at the site has been identified at mound MR3, but during the later period period the focus shifted to mound MR4. The focus continued to shift between localities at the site but by 2600 BC it had relocated at the site of Nausharo, some six kilometers to the south. During this period the settlement was transformed from a cluster of small mudbrick storage units with evidence of the ongoing domestication of cattle and barley to a substantial Bronze Age village at the centre of its own distinctive craft zone.

From its earliest level around 7000 BC Mehrgarh comes to us as a settled Neolithic settlement; we detect no signs that can be attributed to Mesolithic-Neolithic transition.The inhabitants were

Approximate Chronology of Mehrgarh
PeCharacteristics riod
Area Time Span
IA Aceramic Neolithic
Mound MR3 ca. 7,000-6,000 BC
IB Ceramic Neolithic Mound MR3 ca. 6,000-5,500 BC
II Ceramic Neolithic Mound MR4 ca. 5,500-4,500 BC
III Early Chalcolithic Mound MR2 ca. 4,500-3,500 BC
IV-VII Chalcolithic Mound MR1 ca. 3,500-2,500 BC

already farmers although a substantial portion of their substance did come from hunting and gathering. This, however, does not mean that there were no human beings there before 7,000 BC: the absence of any earlier archaeological remains simply means that the site could have been seasonally occupied by mobile groups, possibly traveling through the nearby pass, and left behind no remains.



Map of the Greater Indus Region and the relative location of Mehrgarh and other important archaeological sites

Early Mehrgarh residents lived in mud brick houses, stored their grain in granaries, fashioned tools with great dexterity and lined their large basket containers with bitumen. They cultivated six-row barley, einkorn and emmer wheat, jujubes and dates, and herded sheep, goats and cattle. Residents of the later period put much effort into crafts, including flint knapping, tanning, bead production, and metal working. The site was occupied continuously until about 3000 BC.
3000 BC and the whole area covers a number of successive settlements. Archaeological material has been found in six mounds, on which about 32,000 artifacts have been collected. Covering an area of some 250 hectares, most of the archaeological deposits are buried deep beneath accumulations of alluvium although in other areas ‘in situ’ structures can be seen eroding on the surface.

French Archaeological Mission to Pakistan: The site was discovered and developed by a team of French archaeologists and the members of the Department of Archaeology of Pakistan, headed by Jean-Francois Jarrige. Excavation began in 1974–1975 and continued through the 1985–1986 field season without interruption. These diggings have brought to light a continuous sequence of occupation, ranging from the seventh millennium B.C. to the middle of the third millennium B.C. The focus of research then shifted to the nearby Early and Mature Harappan site of Nausharo. There is no final report on the Mehrgarh excavations, but there are yearly reports, and Jarrige and his team published on the site quite extensively (7-16). The work renewed in 1979 and continued to 2000.



Mehrgarh was abandoned by the time of the emergence of the urbanized phase of the Indus Civilization. During its occupation Mehrgarh illustrates the development of the civilization's subsistence patterns as well as its craft and trade specialization. Following its abandonment it was covered by alluvial silts until it was exposed following a flash flood in the 1970s.

The earliest settlement at Mehrgarh was a small farming village dated between 7000 BC to
A satellite photograph of the terrain wherein the site of Mehrgarh is located.

The French Archaeological Mission for the Indus was founded in 1958 by Jean-Marie Casal, the curator of the Guimet museum.This mission was originally an offshoot of the French Archaeological Delegation to Afghanistan (DAFA), of which Casal had been a member since 1951. Since 1975, this mission was headed by Jean-Francois Jarrige, and Catherine Jarring as assistant director. The fieldwork was largely financed by the Ministry of Foreign Affairs of the Government of France. From 1962 onwards, the mission concentrated its activities in southern Balochistan. The Nindowari excavations of 1962 – 1965, in a mountainous valley of southern Baluchistan, uncovered the traces of a settlement of more than 25 hectares belonging to the Kulli people, dating from the third millennium BC. In 1968, the mission concentrated its activity in the north of Kachi plain and in the Bolan basin. It should be recalled that before these studies were undertaken, the first agricultural villages in these regions did not seem to date from any earlier that 4000 BC. Their emergence was credited to colonies arriving from either the Iranian plateau of from southern central Asia. But the work at Mehrgarh enabled a complete re-evaluation of the archaeology of these regions and particularly of the antecedents to the large urban settlements of the Indus valley that was to come.

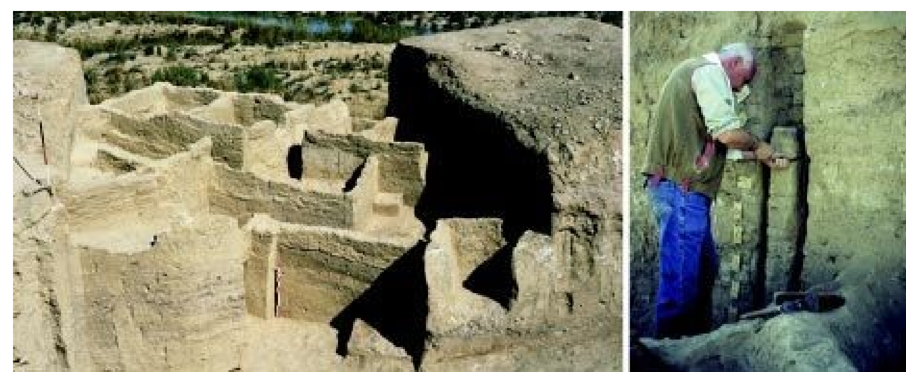
Kachi Plain: Considering the significance *izkX/kkjk] vad & 18*of the site of Mehrgarh and the general continuity of


Fig. 4 : The Brahui Range seen from the site of Mehrgarh. © C. Jarrige

The Bohi Range seen from the site of Mehrgarh

been subjected to changes in the course of the *(C. Jarrige)* and at Nausharo. They collected samples from last 10.000 years. In the case of the Bolan area, several columns in the Neolithic deposits (Period I) Lorenzo Costantini and Alessandro Lentini have (Fig. 5). carried out palynological investigations at Mehrgarh The preliminary results of their work have been

occupation here into the Indus Civilization period, it is important that we try to understand, however briefly, the geographical character and significance of its location. Mehrgarh and the site of Nausharo lie a little to the southwest of Dadar in the Kachi plain. Sibi lies about 24 km to the northeast of Dadar. This area and the Kachi plain as a whole extending in the south up to Jackobabad experiences

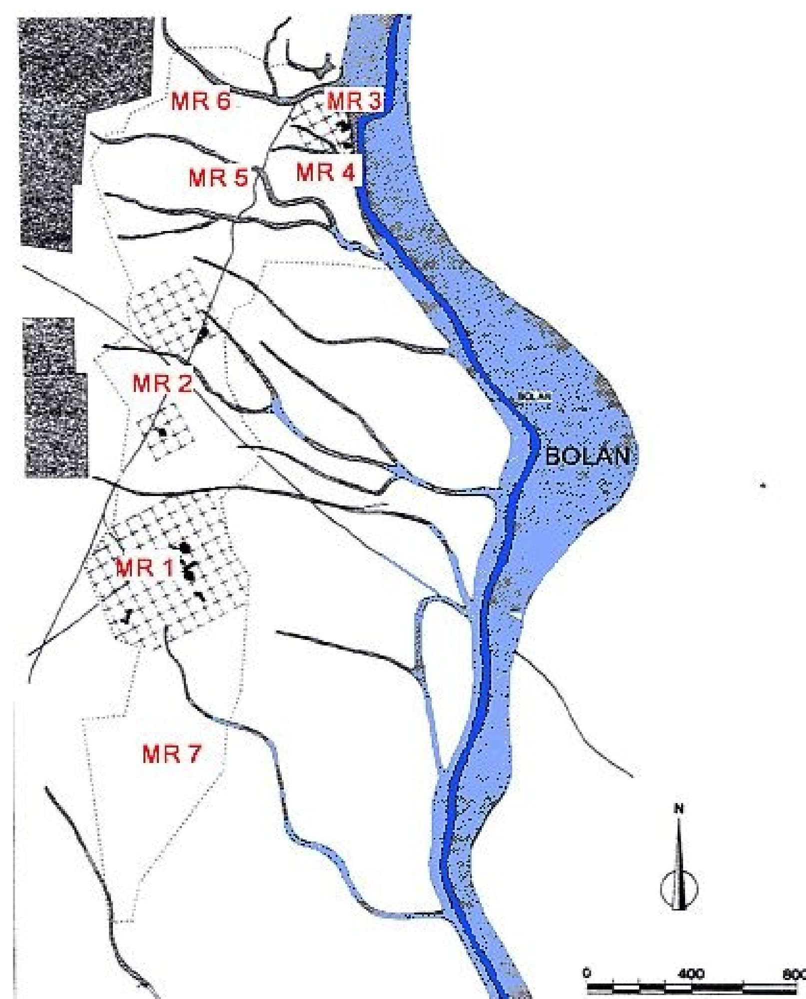


extreme heat in summer, reputedly the highest in Pakistan. However, from the irrigation point of view the area cannot be bad. Numerous non-perennial

 watercourses dot the Kachi plain, and dams were put across their courses to make them overflow and make agriculture possible. Another important point to note is that this area is close to the entrance of the Bolan Pass from the Indus side. Mehrgarh itself is located on the Bolan River, a perennial stream that drains out of the highlands of Baluchistan into Kachi. It is a rich alluvial area, with adequate water resources for agriculture. The river has greatly damaged the site over the millennia, and a substantial portion of the midden has been removed by erosion (42).

Kachi is a flat alluvial plain, an extension of the Indus Valley plains into an anomalous nick in the eastern edge of the Iranian plateau. It is thought that the Pleistocene Indus River flowed in this area, so that the alluvium is quite deep. Mehrgarh is politically a part of Baluchistan but geographically it is more a part of the Indus plain. The politics of its capture by the Brohi Khans of Kalat is an interesting

story and has been told and retold in several versions.



Relative locations of various Mehrgarh sites

The Bolan river, whoich flows down a major route of communication between the Indus Valley and Baluchistan and southwestern Afghanistan, is the principal hydrological feature of the area. It is not large enough, however, to reach the present course of the Indus and disappears into the alluvium of the plain. The Nari and the Mula River are other significant sources of water in Kachi. It is the deep alluvium and the presence of the rivers and streams that flow into the northern and western fringes of this plain made it an important agricultural area in prehistoric times. In fact Kachi is called the "Breadbasket of Baluchistan" because of its agricultural productivity. One of the secrets for the success of agriculture in Kachi was the building of temporary dams and bunds on all of these streams. Based on the paleobotanical evidence, it can be expected that this was practiced early on in history.

Archaeological Significance: Mehrgarh is now seen as a precursor to the Indus Civilization. "Discoveries at Mehrgarh changed the entire concept of the Indus Civilization" according to Ahmad Hasan Dani. "There we have the whole sequence, right from the beginning of settled village life."

According to Catherine Jarrige, one of the excavators at Mehrgarh, "…the Kachi plain and the Bolan basin (are) situated at the Bolan peak pass, one of the main routes connecting southern Afghanistan, eastern Iran, the Baluchistan hills and the Indus River valley. This area of rolling hills is thus located on the western edge of the Indus valley, where, around 2500 BC, a large urban civilization emerged at the same time as those of Mesopotamia and Ancient Egypt. For the first time in the Indian subcontinent, a continuous sequence of dwelling-sites has been established from 7000 BC to 500 BC, (as a result of the) explorations in Pirak from 1968 to 1974; in Mehrgarh from 1975 to 1985; and of Nousharo from 1985 to 1996."

Chronology of Mehrgarh: Mehrgarh is an area of over 495 acres (200 ha) but the area was never totally settled at any one time, and there is a great deal of lateral and successive settlement scat

Mehrgarh Kalibrierte Radiokarbondaten Periode v. Chr. (BC)
Periode IA 6925 ± 80
7115 ± 290
5720 ± 730
5530 ± 180
5830 ± 190
9385 ± 120
5990 ± 70
5860 ± 70
Periode IB 6110 ± 90
6290 ± 70
5238
13340 ± 125
32650 ± 3000
8440 ± 250
5950 ± 65
6020 ± 80
6090 ± 70
5940 ± 100
5880 ± 100
Periode IIA 5620 ± 100
5490 ± 70
5400 ± 90
Periode IIB 7115 ± 120
5240 ± 110
5360 ± 310
Periode III 6500 ± 80
Periode IV 4190 ± 140
3590 ± 60
Periode V keine Radiokarbondatierungen
Periode VI 3960 ± 140
Periode VII 3570 ± 150
ter that belongs to different time periods since the aceramic Neolithic period (the end of the 8th and the beginning of the 7th millennium BC) until about 2600 BC, at the beginning of the Indus Civilization. Archaeologists divide the occupation at the site into several periods. Chronology of different periods of this sequence is not particularly clear-cut but they can be generally assigned a chronology as shown in the following table. The whole occupation history of the site is divided into eight Periods, designated as Period I to Period VIII. They are then grouped into four cultural stages: aceramic (prepottery Neolithic), ceramic (Neolithic with pottery), chalcolithic (when the use of copper, along with stone, is indicated), and the bonze age (people used copper and bronze extensively). We are concerned here mainly with a time period up to Period VI: the study of Period VII and VIII more appropriately belongs to the study of the urban phase, covered in Volume III. There are several radiocarbon dates available from Mehgarh; They are listed in the following table. For the early periods (up to Period III) a scheme based on occasionally inconsistent radiocarbon dates

has been offered by J-F. Jarring (22): Mehrgarh Period I: 7000, 6500, 6000 BC
Mehrgarh Period IIA : 5500 BC
Mehrgarh Period IIB: 5000 BC
Mehrgarh Period III: 4,500 BC
There are 16 radiocarbon dates from aceramic Mehrgarh that range between 5182 ± 80 BC, 5378 ± 290, 6743 ± 250, to 7716 ± 120 BC and even 11790 ± 120 BC (all dates uncalibrated). In view of these dates the beginning of the foodproducing economy at the site can be confidently placed within the seventh millennium, with the paleosols of Period IA arguing for the beginnings of this occupation at a date close to 7000 BC, offering a very strong case for an indigenous process of domestication within the Greater Indus Region. Otherwise, it is evident that Mehrgarh, for the time being, must be added to the list of sites which, for various factors, have yielded many C^{14} dates which are either too early or too late to be consistent with the stratigraphy and the regional sequence. With the same account, we must also not forget that charts of radiocarbon dates from sites in western and central Asia which follow a logical order often represent a selection of already selected dates. This bias is proving to be extremely difficult to get rid of.
For the later periods, there are some types of pottery which have also been found elsewhere and thus, it is possible to have an idea of the chronology of these periods through cross-dating. The dates for the later periods of the settlement is represented from the nearby settlement of Nausharo, along with the related sites of Pirak and Sibri in the same general area. They are contemporary with the Harappan Civilization and do not concerns us here except that they provide us a chronological link between the Neolithic and Chalcolithic settlements of Baluchistan and Sindh with the urban civilization if the extant Indus Valley.
Mehrgarh Period I: The earliest occupation, with an aceramic Neolithic culture, is in an area called MR.3, in the northeastern corner of the site. It is designated as Period I. This period is sometimes divided into two sub-divisions: Period IA and Period IB. Period IA denotes an early aceramic culture while Period IB is somewhat later but still aceramic. This subdivision occurred after considerable excavation had been completed at Mehrgarh. Thus, it seems appropriate if we discuss Period I as a whole since that is the term used in most of the origin literature. Where IA can be distinguished from IB the difference will be recognized. The same situation pertains to Periods IIA and lIB.
It appears that the earliest farming and animals husbandry in the area was attempted by semi-nomadic people using plants such as wheat and barley and animals such as sheep, goats and cattle. The settlement was established with simple mud buildings with four internal subdivisions. NuMore than 700 sq m area has been opened and that has shown that the settlement consisted of multiroom units separated from one another by open spaces that held numerous human burials. Some of the structures were divided into small square compartments apparently used for storage. The main building material was rectangular mud-brick. The dwellings were simple mud-brick structures, 16 by 13 feet (5 by 4 m) on the average, frequently subdivided into four to six rooms. The floors occasionally had reed impressions. A number of ovens and circular hearths have been found in the excavated areas. They were usually found in the corners of rooms, and signs of their use are reflected in traces of smoke on the plastered walls. One circular oven lined with bricks had a dome, which was traced in its collapsed condition.
The clearing of the upper levels of the aceramic neolithic settlement (MR3) over more than 1500 square meters provided the French team with a substantial image of its internal patterning. An increasing number of multi-roomed units were ex

Chronological Relationship of the Periods, Site, Archaeological Features, and Dates

Period Site Main Features Date (millennium)

I MR3 Pre-ceramic, unbaked figurines
II MR4 Straw tempred pottery, polished plain ware, cylinder seal III MR2 Painted pottery, first evidence of metallurgy
IV MR1 Painted pottery (geometric decor), terra-cotta figurines V MR1 Painted pottery (white paint), first grey ware, human figurines VI MR1 Black-on-grey ware, Quetta red ware, aNl polychrome VII MR1 Black-on-gre ware, Quetta and oKt Diji ware
VIII Sibri Central Asian pottery, cylinder seals, shaft-hole axe

7th-6th
5th BC
First half 4th Middle 4th
End 4th
Beginning 3rd Middle 3rd
End 3rd

merous burials have been found, many with elaborate goods such as baskets, stone and bone tools, beads, bangles and pendants. Ornaments of sea shell, limestone, turquoise, lapis lazuli, sandstone and polished copper have been found, along with simple figurines of women and animals. Sea shells from far sea shore and lapis lazuli found far in Badakshan, Afghanistan, shows good contact with those areas. A single ground stone axe was discovered in a burial, and several more were obtained from the surface. These ground stone axes are the earliest to come from a stratified context in South Asia. No trace of pottery has been detected, hence “aceramic” or “pre-pottery” Neolithic.

The period is dated to the seventh millennium B.C. However, ten meter thick deposit required a long span of time and it appears that Period I is to be bracketed between late eighth millennium B.C. and sixth millennium B.C.The radiocarbon dates allot a date slightly prior to the seventh millennium B.C. for the beginning of this period. posed, separated by open spaces used both for domestic activities and as burial grounds. Apparently the reconstruction phases of the settlement were planned in respect to the orientation or the spacing between the houses. Such planning, the quality of crafts, as shown by the fine ornaments from the graves, and the presence of buildings such as a monumental funerary platform exposed in 1979-80, are all elements which suggest an already complex social organization by the end of the seventh millennium BC and the early sixth millennium BC, supported by skilled artisans and successful farmers (22).

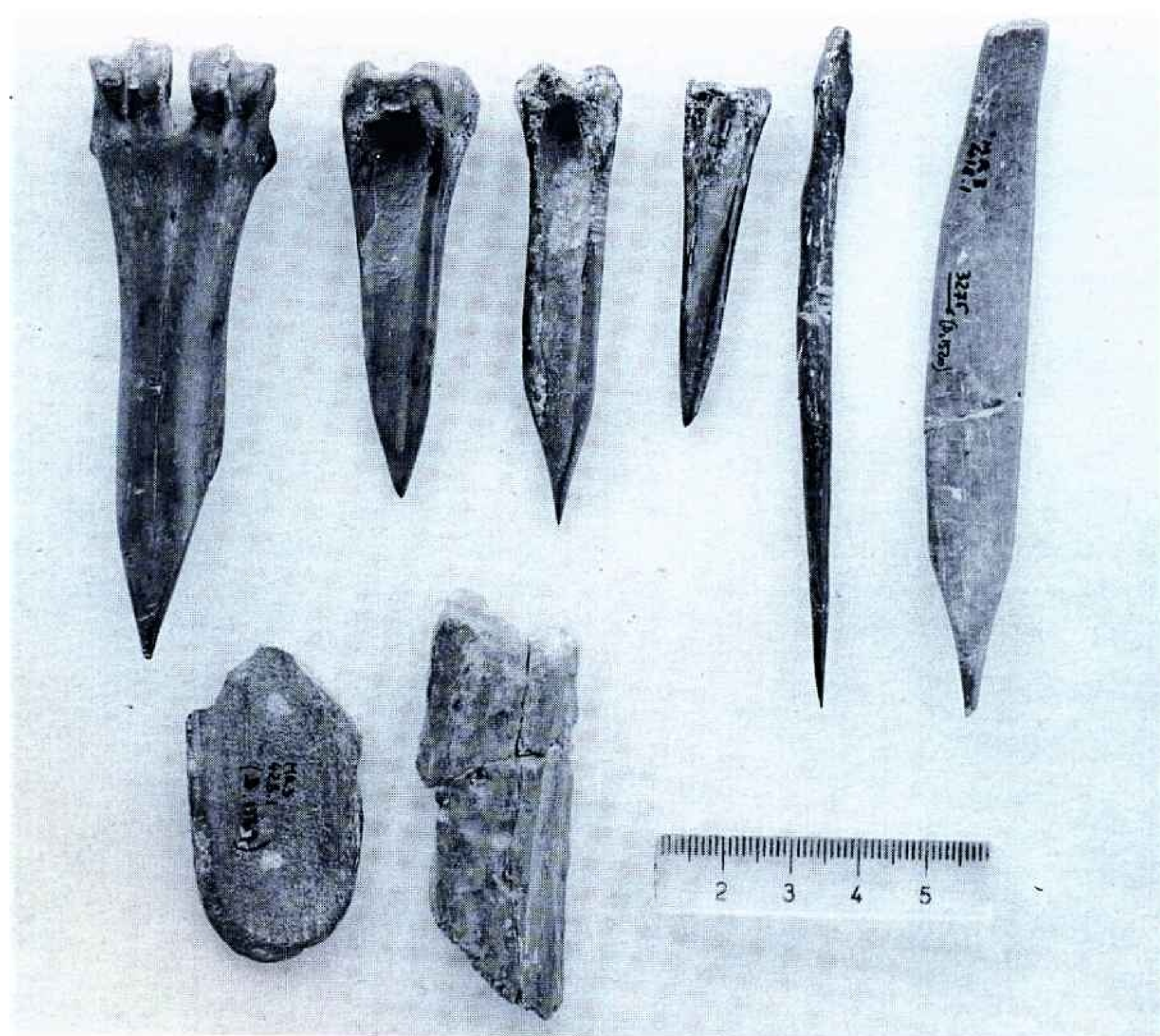
The technology of Mehrgarh I was simple. Stone tools included grinding stones and small flint blades and flakes. The bed of the Bolan River carries cobbles of light brown flint from which tools were fashioned; some were sickle blades that occasionally carried sheen. Ground-stone food processing tools were found: quern and grinding-stone fragments, two small limestone chisels, a small bowl, and a small mortar. The small amount of copper is thought to be of the native variety, not smelted.

The excavation of nearly 360 graves has enabled a detailed study of funerary effects, which provides a wealth of anthropological and social indicators. The funerary objects include utilitarian objects, but also an abundance of ornaments of a quality which bears witness to the skill and energy of craftsmen using materials from relatively faraway regions, notably several seashells, lapis lazuli, turquoise, steatites and calcites. The dead were sometimes buried with tarred baskets at their feet. In the earliest levels the bodies were buried both in the flexed position and in the extended position and covered with red ochre. The grave-goods included polished stone axes, blades and geometric microliths of flint, stone vessels, cakes of red ochre and personal ornaments, such as strings of beads, several of them made of imported turquoise and lapis lazuli. The beads were made out of shell, bone, various local stones and imported turquoise. Significantly, a copper bead in cylindrical shape has also been found. Sometimes a basket coated with bitumen was included and placed near the body filled with perishable goods. Incidentally, it also shows that the earliest pottery at Mehrgarh was made from the baskets coated with bitumen and clay. The device was simple and effective: it made the walls of the basket impervious and, therefore, pot-like. Later on, in the succeeding Period II, the pots were made directly from clay.

The artifacts recovered from Period I are most abundant - flint tools alone are 20,000. Geometrically shaped flint bladelets, such as trepezes and triangles represent 4 % of the total. Among the bone tools, awls predominate. There is a rich bone industry. Awls, spatulas, a bone needle, and two highly polished bone pendants with round perforations were found. The other most significant finds of this period include five clay figurines, three represent human beings and two animals.

Paleobotanical material from Period I is rich and complex. Most of the evidence came from thousands of impressions in the abundant mud bricks of the period. The dominant plant is naked six-row barley (*Hordeum vulgare*, subspecies *vulgare*, variety *nudum*). More than 90 percent of the seeds and imprints were identified as this plant. There is hulled six-row barley (*H. vulgare*, subspecies *vulgare*), two-row barley (*H. vulgare*, subspecies *spontaneum*, and *H. vulgare*, subspecies *distichum*), einkorn (*Triticum monococcum*), emmer (*T. turgidum*, subspecies *dicoccum*), and hard wheat (*T. turgidum*, cf. conv. *durum*) present in greatly reduced amounts. The only unidentified noncereals include the Indian jujube (*Zizyphus* sp.) and dates (*Phoenix dactylifera*), represented by stones in an upper level of Period IB as well as Period IIB. Einkorn and emmer disappear from use in the region, but bread wheat and shot wheat continue on as the eastern species of *Triticum*.

Some imprints of six-row barley, einkorn, emmer and bread wheat were found about seven meter below in the early Neolithic (MR3) deposit. In other levels of this deposit the remains of plants other than cereals have also been traced. Charred seeds of the plum-like jujube fruit and the stones of dates have equally been uncovered in these levels, indicating that both trees were food resources in the Neolithic times. Agriculture was practiced as is evidenced from several sources: first by the flint blades showing sheen produced from cutting plants; secondly the finding of the impressions of various cereal grains in the mud debris, like two-row barley, six-row barley, einkorn wheat, emmer, and bread wheat.



Bone tools from Mehrgarh IB (*JF. Jarrige*)

The animal remains are another important sources of information about the development of Neolithic culture at Mehrgarh. In the earlier assemblages the remains of wild animals like gazelles, wild sheep, wild goats, swamp deer, large antelopes and wild cattle could be seen in large numbers but in later periods they are gradually replaced by the domesticated varieties - domesticated cattle, goats, etc. A few remains in the upper levels of Period I also show wild characteristics - gazelles, wild pigs, onagers. It is thus clear that the earliest Neolithic period at Mehargarh witnessed the process of domestication of plants and animals as early as it did in Western Asia. Interestingly, a number of bones of water buffalo have been found in the neolithic assemblages from quite early on. In Period IA, the animal economy is dominated by twelve species of 'large game' animals. Richard Meadow takes this to indicate that the first inhabitants of aceramic Mehrgarh I exploited not only the surrounding hills but the Kachi Plain itself. Fish and birds are lacking in any quantity, which seems to signify that the Bolan River and the wet environments around it were not important to the inhabitants

of Mehrgarh. There are so far no remains reported from this region which could be connected to a pre-neolithic stage which, as in the Levant or the Zagros area, corresponds to a phase of incipient cultivation.

Some of the similarities which exist between early villages of the Near East and the Neolithic settlement at Mehrgarh could be the result of a direct diffusion of a neolithic cultural assemblage from western Asia to the Indus system. But one must not exclude the possibility of further discoveries, which could indicate that this region was not an archaeological vacuum before the beginning of the occupation of Mehrgarh. Some original aspects of the process of domestication of plants and animals, as they are reconstructed by Costantini and Meadow (see Chapter V.2), could imply an earlier stage of exploitation of the natural resources of this region by people whose remains are still to be found.


Fig. 14 : Period I: flint microliths set in bitumen.*C.Jarrige* © C. Jarrige
picked surface and it is only in a later stage (level 7)
two mounds: the more recent overlying the south
that the axes are polished, the finer examples coming
ern slope of the earlier one. One can see clearly
from the graves of Cemeteries 8 and 9 (Fig. 15).that the lowest level of the early mound expands

towards the south onto what was then the surface of the plain. This early level is overlaid by thick strata of alluvium which have partly buried the neolithic mound. It is believed that such alluvial strata must have accumulated when the Bolan basin was blocked due to tectonic activities and the area turned into a marshy zone. These alluvia are capped, on the top of the cliff-like exposure, by archaeological remains of what is now Period lIB (*ca.* 5000 BC). Such a process of accumulation of archaeological layers, i.e. paleosols and alluvial strata, cannot be interpreted to have taken place in a short span of time. Therefore, some of the resemblances which are obvious between the first neo



lithic settlement at Mehrgarh and various early farming villages of the Zagros area imply also some de

Fig. 15 : Period I: Polished stone axes. © C. Jarrige gree of contemporaneity in the very early eighths millennium, if not earlier.
The remains of several workshops of beadmakers318 with beads in calcite or steatite in various

stages of processing have been found in different levels (Fig. 16). The gravegoods have also provided us with a

Out of more than 32,000 microlithic, mostly blade-based artifacts (with the exception of a handful of ground 'neolithic' celts) from the site, about 20,000 or more belong to Period I, and their number decreases throughout the later periods. Microlithic tools and blades set into the groove of the sickle as a series of pointed teeth and glued with a thick layer of bitumen seem to be a distinctive feature of the site. The raw materials for the lithic industry came as chunks from the Bolan bed.

The appearance of chaff-tempered pottery in Period IB appears on the scene between about 6000 and 5500 B.C. (24) and helps in interpreting these dates. Continuity and change are marked with the introduction of soft, buff, chaff-tempered pottery in Period IIA. The ceramic phase at Mehrgarh begins ca. 6000 BC, as recent stratigraphic reas

sessment indicates. Pr¢gdh¢r¢, No. 18The upper levels of Period I reveal an in creasing number of multi-roomed units separated by open spaces meant both for domestic activities and burials. In the deepest levels one particular room measured 2 m by 1.8 m, with impressions of reed on the floor and a grinding stone. The walls were made of mud bricks of regular size (33 or 28 cm by 14.5 cm by 7 cm), which also carried finger impressions. Hearths were a common feature. Stone vessels are rare, as are other stone objects, including perforated discs and spatulae with incised criss-cross designs so common at roughly contemporary site of Juror in eastern Iran. As described by Jean-Francois Jarrige (10), the aceramic deposits (Period I) are approximately 7 meters thick. They have been divided in 9 main levels. Each level has its distinct internal stratigraphy and an obvious variable length of time. But as a



whole, each of them is marked by a similar course

Fig. 16 : Period I: remains of a steatite beads workshop
of main episodes starting first with the edification of showing stages of manufacture. © C. Jarrigemudbrick houses. Such buildings often show modi
fications in the course of time and there are also cases of houses still being occupied when an adan early context and also the use of resources from
joining one was already abandoned. The next stage
often far away regions.
evidenced in each of the 9 major episodes, both in the northern and southern trenches, occurred when

The graveyardsanother area was selected to build new houses.

While the abandoned buildings of the left over area
were collapsing, they were progressively filled up

Alternating with the nine building levels, nine levels
with dump thrown by people living in another more or less adjacent area. After a span of time difficult to
of graveyards have been recorded. A total of 318
evaluate, burials were dug in the accumulating
graves have been exposed, among which, from level
waste mixed with the debris of the collapsing walls of the abandoned houses. It has also been noticed
1 to level 9, 179 have yielded gravegoods. At the
that in most cases the graves pits had not cut
bottom of an about 1 m deep pit, a small space dug
through the walls of the ruined houses, therefore it
can be assessed that the crumbled upper parts ofon one side of the pit was used as a small burial
the walls were still visible when the area was turned
out into a graveyard.chamber. Then the burial chamber was, after disposal of the dead body always in flexed position, blocked
activity, possibly due to the density of graves, came
by packs of hard clay or by brick walls, and the pit
to an end. Then, the former graveyard became an
open space until leveling operations were carriedwas filled with earth. More than 75% of the graves
out in preparation for the edification of a new set of have an East-West orientation. The heads are in

many cases looking toward South, but also towards East and more seldom towards North. Other graves are mostly oriented North- South.



Fig. 2 : MR 3 North levels3 to 9. The site was later cut and

3
site was later cut and shaved by floods of the Bolan River (in the background)

A shaved by floods of the Bolan river (in the background).

Evidence of nine levels of building, with nine corresponding levels of burial grounds, have been found in the Neolithic aceramic sector (period I). Houses of crude rectangular brick, some decorated with paintings on the external walls, were built to a roughly similar design. The agricultural economy was dependent on the cultivation of barley, but the staple meat diet was provided by hunting, even though the beginning of the domestication of goats was recorded at this time. During this same period, livestock farming overtook hunting and not only was the Indian zebu (*Bos indicus*) domesticated, the domesticated variety became more common than the wild. Palynological studies have shown that plant growth was less lush then than exists today.

Alltheexcavatedbuildingsaremultiroomed structures. Four different plan-types have been recorded: two-roomed, four-roomed, sixroomed and ten-roomed buildings. Most of the walls of these buildings were composed of two rows of hand-moulded mudbricks longitudinally arranged. These long and narrow bricks measured 62 x 12 x 8

II. The Neolithic figurines

The Neolithic human figurines from Mehrgarh are so

domestic dwellings. The same process would occur cm with generally on their upper faces a herring

again when, after possibly more than two generafar the most ancient assemblage known in the wholebone pattern of impressions of the brick-makers

tions, the inhabitants of the area would decide to thumbs to provide a keying for the mud-mortar in

build their houses in a new location. When the walls subcontinent. They account for about 100 items,which they were set. The earliest buildings (level 1),

of the abandoned buildings had crumbled down and resting directly on the natural soil, include a two

were progressively buried in dump and layers ofmore or less complete or fragmentary, throughoutroomed building. Seven other structures of this type

mudbrick debris, the area was again used as a have been unearthed (two in Level 3, two in level 4

graveyard, following the process already described.the Neolithic: 81 in period I, 17 in period IIA andone in Level 6 and two in level 8). By their size, the

It is difficult to assess the total duration of Period I,

4 in period IIB.but according to the number of superimposed occu

pational levels and graveyards, the formation of the mound could easily have lasted for about a millen nium.

five buildings found in levels 3, 4 and 6 seem to be

dwelling places. Seven structures of this type have been unearthed (two in Level 3, two in level 4 one in Level 6 and two in level 8). The best-preserved and completely excavated ones measures 6,25 x 4,50

meters (House XXVII Level 4) and 5 x 4,20 meters (House XXV level 4) and are composed of two long rectangular rooms.
The four-roomed buildings represent the most popular plan used by the inhabitants of Period I. Such

structures were uncovered in all the levels from levels 3 to level 9. The mud-brick walls are approximately 30 cm wide (two rows of bricks) and the average size of the structures is 5,50 by 3,75 meters. The four rooms have more or less the same size and often small openings connect the rooms between themselves and to the outside.
In level 7, two structures

with 6 symmetrical rooms have been recorded. The six-roomed buildings revealed no fireplace or significant groups of remains connected with domestic activities, contrary to what we have often noticed in the case of the houses divided into four rooms. This supports well the assumption that the six-roomed buildings are the prototypes of the compartmented buildings of Period II A for which there is good evidence that they were used as granaries or storage facilities.

Traces of fireplaces were found in many rooms. In the open spaces between houses many circular fire-pits have been uncovered. Their diameters range between 40 and 60 cm and their maximum depth is about 35 cm. Most of them contain heavily burnt cracked pebbles. But in one case many ovoid heated clay balls filled the fire-pit. It is obvious that the burnt pebbles and the clay balls were used for indirect heating. Even today in Baluchistan, heated stones are used for cooking bread. It is interesting to mention that in the Harappan levels of Nausharo, near Mehrgarh, hundreds of ovoid clay balls as well as many triangular terracotta cakes were found in the fillings of fireplaces.

The walls of the clay houses were plastered inside and outside with a 2 cm thick clay mortar. There are evidences that the coatings of the external walls of several houses were colored in red or even adorned with paintings. A portion of a collapsed wall from level 1 was colored in plain red ochre. In the upper levels, similar traces of red paint were found on several walls. Quite sizeable fragmentary impressions of external plaster fallen on the ground show red V-shaped motifs and in one case a complex geometrical pattern of red lines and

Period I: Grave of a woman with a young goat © C. Jarrige
(*C. Jarring*)
are characterized by the diversity and by the richness of the ornaments placed with the dead at the time of
red and black dots. Some floors made of packed
and
rammed
earth
were
also
covered
with
red
the inhumation. Exceptional grave deposits are ochre. Some roofing fragments have also been dis
dentalium headbands found on the heads of several
covered in the building debris. They consisted of fragments of chaff-tempered mud with several im
females like for example in Tomb 573. In Burial 274
pressions of fibrous stems of reeds.
Traces
of

fireplaces
were
found
in
(Fig. 18) the headband was made up of woven rows
many rooms. In the open spaces between houses many
of small dentalium segments and was closed by two
circular fire-pits have been uncovered. Their diame
straps used as a clasp. Each of them was ornamented
ters range between 40 and 60 cm and their maximum depth is about 35 cm. Most of them contain
with four perforated natural shells. Around the neck
heavily burnt cracked pebbles. But in one case
was a thin necklace made of shell beads and at the
many ovoid heated clay balls filled the fire-pit. It is obvious that the burnt pebbles and the clay balls
waist, a belt-like ornament was made up of cylindrical
were used for indirect heating. Even today in Balu

shell beads and of one flattened polyhedral shell$_{320}$ bead. Hanging on the belt, an interlacing of numerous threaded dentalium beads was found in front of the

pelvis of the individual.

chistan, heated stones are used for cooking bread. It is interesting to mention that in the Harappan levels of Nausharo, near Mehrgarh, hundreds of ovoid clay balls as well as many triangular terracotta cakes were found in the fillings of fireplaces.

The rather large scale of the excavated areas indicates that the layout of the houses follows a rather regular pattern. They are divided into two groups, one having its main axe East-West oriented and the other North-South. Between houses, open spaces allowed an easy circulation. This layout with its symmetrically disposed houses, with rather regular open spaces in-between, forms a marked contrast with the plans of several Neolithic settlements from Western and Central Asia, where the houses cluster tightly together and where there is no evidence for alleys, doorways or large open spaces. The plans of the houses from early villages so far recorded in the Neolithic of Western or Central Asia often show rather irregular combinations of small cubicles of various sizes

Amongst the layers at the end of Period I (ca. 6000 B.C.) were found ornaments with copper beads, one of which still carried the trace of a cotton thread, the oldest known example of this fiber being used. With the dawn of period IIA, the first pottery made from unrefined clay began to appear. The development of agricultural activity is clearly borne out by the presence of impressive collections of buildings containing crates and partitions, identifiable in many cases as being used for the storage of cereal crops. In the period IIB, pottery becomes more refined. But it is not until a little after, around 5000 BC, that geometric designs painted onto increasingly elegant receptacles begin to appear.

It took a great deal of work to settle the stratigraphic picture for Mehrgarh Period I and its relationship to Period II. Richard Meadow has given the following synthesis: Bricks of regular size (33 x 14.5 x 7 cm or 28 x 14.5 x 7 cm) were used, along with other irregular sizes. They are generally bunshaped and have finger impressions on their tops. Some walls were thin, with only one course of

bricks; others were wider with two or three”. One structure (Structure B) is described as follows:

"...6.3 m by 6.7 m, is oriented north-south, and is made up of six rectangular rooms. Three rooms measure 2.25m by 1.5m and the other three 3.3m by 1.5m. No doorways between rooms were found even though there are two, three, or four preserved courses of bricks. The walls were made of two rows of bricks that are of various sizes. The floors of five of the rooms were covered with pebbles (three rooms were completely covered with them). In several rooms there were fireplaces, grinding stones, mullers, bone tools, faunal remains, and flints. A polished stone axe was found in one of the rooms and west of this building, a rectangular lapis lazuli bead was found” (25). These compartmented buildings can be interpreted as A Prelude to Civilization

storage facilities . The case is clearest in Periods IB and II, it can be outlined here:

“In our previous reports we have discussed the question of the function of the compartmented buildings, and we proposed that they were large storage units. The fill of the buildings exposed so far contains no evidence to indicate that they were used as living quarters. Many of the cell-units are no larger than one square meter and movement in such a confirmed space would have been difficult. There is also no evidence that these structures served as a kind of foundation system on which domestic superstructures were raised. The fourth building of the complex exposed in this MR.3/ 4 AG and N sector is preserved to a height of more thanPr¢gdh¢r¢, No. 18 fifteen courses of mud-brick and thus cannot be


Fig. 8 : Wall plaster with a polychromel pattern of red

Period I: Wall plaster with a polychrome pattern of red

lines and red and black dots from a house in MR3 N. © C. Jarrige(*C.Jarrige*)

fire-pits have been uncovered. Their diameters range
interpreted as a substructure. As we pointed out for
between 40 and 60 cm and their maximum depth
the fill in most cases is rather homogeneous, a fact
is about 35 cm. Most of them contain heavily burnt
that indicates that trash was not allowed to accumu
cracked pebbles (Fig. 9). But in one case many
Many of the compartments were filled with fallen
ovoid heated clay balls filled the fire-pit. It is obvious
bricks suggesting that several of these buildings
that the burnt pebbles and the clay balls were used parts of the walls collapsed. We still believe that the for indirect heating. Even today in Balochistan, heated most likely explanation for these buildings is that
stones are used for cooking bread. It is interesting Storage facilities of this type begin in Period
to mention that in the Harappan levels of Nausharo, I; as agricultural production increased so did their

near Mehrgarh, hundreds of ovoid clay balls as well nal storage, or at least a system that extended be as many triangular t.c. cakes were found in the yond the needs of a nuclear family, is suggested fillings of fireplaces.from the size of these facilities. A case can be made that these buildings may have been entered through
the roof. No doors have been found in any of the
The rather large scale of the excavated areas indicates
walls and some walls are preserved to a substantial
that the layout of the houses follows a rather regular
height; one (Structure F2) to a distance of three
meters (25).

Mehrgarh Period II: Mehrgarh Period II Mehrgarh Period II 

321 3500 BC) were ceramic Neolithic (i.e., pottery was now in use): the later periods are designated as chalcolithic (i.e., some copper and bronze was in use). Period II deposits have been encountered in Area MR4. Period II settlement is still neolithic, going back to the sixth-fifth millennium B.C. It is further divided into IIA, IIB and IIC (22).

In llA the pottery appears for the first time but it is hand-made, crude, chaff tempered - occasionally slipped in plum red. Quantitatively, it is extremely limited. In a 300 sq m area only two to three potsherds were encountered. The excavator had compared this pottery with that found in Western Iran, at sites like Sang-e-Chakmak, in the levels just above the levels of aceramic neolithic. Unfortunately, the deposits of this period are found largely washed out. However, remains of three compartmented buildings have been detected in these levels.

Much evidence of manufacturing activity has been found and more advanced techniques were used in the fabrication of artifacts. Glazed faience beads were produced and terracotta figurines became more detailed. Figurines of females were decorated with paint and had diverse hairstyles and ornaments. The first button seals were produced from terracotta and bone and had geometric designs. Technologies included stone and copper drills, updraft kilns, large pit kilns and copper melting crucibles. Amongst the very few antiquities discovered in this level one deserves very special mention - an elephant tusk, grooved by artisans. Undoubtedly this is the earliest evidence of ivory work in this part of the world.

Two flexed burials were found in period II with a covering of red ochre on the body. The amount of burial goods decreased over time, becoming limited to ornaments and with more goods left with burials of females. There is further evidence of long-distance trade in period II: important as an indication of this is the discovery of several beads of lapis lazuli - a raw material not locally available.

The cereal remains include seeds of barley *(Hordeum sphaerococcuum)* found in the cell units as well as in an ashy dump north of the building in large numbers. This is to be noted that this species was completely absent in the levels of Period I, i.e. aceramic neolithic. Since this variety of barley could

be grown only in the irrigated fields, it implies an improved method of farming in the Kachhi plains. By the end of the aceramic period the faunal assemblage is different: “Almost all of the faunal remains that can be identified come from sheep, goat or cattle, three of the domestic animals of principal importance in the area from the Near East to India. The very fact of their over-whelming importance in the faunal assemblage is good evidence of the keeping of these animals by the peoples of later Period I” (26).

Compartmented buildings on hard clay foundations suggest systematic storage of grains, the seeds of barley *(Hordeum sphaerococcum)* having been found in some of the cells. Some of these building spaces were also associated with the working areas for steatite objects and bone tools. A cylinder-shaped terracotta bead found outside one of these buildings, if rolled on clay, makes a cylinder-like vegetal design. A ring, a bead of copper and a small copper ingot appear in an early corded. Significantly, an open-space, east of the

level of Period lIB, but otherwise the lithic and bonepreserved to a substantial height; one (Structure
tool kit of the earlier period continue to be in use.F2) to a distance of three meters (25).animal bones mixed with ashes. The space yielded

Two complete sickles with inset micro lithic tools, an
ivory tusk. lumps of red ochre and grinding stones
more than 100 bone awls and several grooved

Mehrgarh Period II: Mehrgarh Period II

stones used in shaping their points. It shows some

have been found. Graves have been mentioned but(5500-5000 BC) and Merhgarh Period IIIthe details seem to be missing. Cotton *(Gossypium* tinued during this period. The stone implements(i.e.,*sp.)* occurs in this period. Outside the walls of one(4800-3500 BC) were ceramic Neolithicincluded grinding stones and flint tools in abun
of the structures several hundred charred seeds pottery was now in use): the later periods are

were found in a large burned area.
The discovery
ditions to our knowledge of plastic art in the India of

designated as chalcolithic (i.e., some copper andof cotton seeds is remarkable since this is the earlithe fifth millennium B.C. However, Th.e metal re

est evidence of this item in this part of the world.

bronze was in use). Period II deposits have been

mains were scarce-one copper ring and one copper

The number of potsherds increases in Period bead alone have been recorded.
IIB but only slightly. The increase has been
attributed by the excavators to the fact that now the pottery becomes much finer with vessels shaped on a turn table and afterwards expanded and rounded with a dabber. However, since the increase in pottery is extremely limited, it is doubtful if pottery as a cultural element played any significant role in the everyday life of the people. Period lIC, along with the handmade and basket marked pottery we have now for the first time the wheel-thrown pottery similar to Kili Gul Muhammad II style. It is to be noted that now onwards we have the evidence of pottery being produced on a mass scale.

Wheel-made pottery begins to appear along with handmade ones in Period IIC. The second half of the fifth·millennium BC is a rational enough date for Period III, and that takes off with tell-tale evidence of increasing craft-specialization and perhaps increasing social organizational complexity: fine micro-drills in stone indicating the use of bow-drills and the ability to engrave on

shell; a few terracotta crucibles with traces of copstillper, which suggest for the first time local coppersmelting; large-scale production of wheelmademillennium B.C. It is further divided into IIA, IIB

painted pottery showing inter-regional styles; and

and IIC (22).

Period IB (25). There are strong signs of continuity

In llA the pottery appears for the first

well. When the excavations at Mehrgarh were still in

finally, 'an impressive complex of storagetime but it is hand-made, crude, chaff tempered - maintained in five compartmented buildings over their infancy it was thought that Period I was entirely

three building phases. This is also the period when

occasionally slipped in plum red. Quantitatively, it

aceramic. But then a few coarse chaff ware sherds

terracotta humped bulls first appear, although only is extremely limited. In a 300 sq m area only twoas isolated examples. to three Period IB. The use of pottery

increases in Period IIA TheAnimal bone fragments, found in abunpotsherds were encountered.

and is now found in domestic contexts, not just re

dance, revealed the presence of important domestiexcavator had compared this pottery with that

IB and IIA .

cated animals - cattle, sheep and goat. Cattle domifound in Western Iran, at sites like Sang-e

nates. And this is very significant since
tlements during the Neolithic times
the hill set
Period II represents growth and continuity

Chakmak, in the levels just above the levels ofwould favor out of Period I and there is justification for them as a sheep and goat. These animals provided most ofaceramic neolithic. Unfortunately, the deposits of the meat to the people of Mehargarh during the Cethis periodsubdivided into rooms that are contemporary without.ramic Neolithic times. are found largely However,

322

remains of
compartmented buildings is important to our knowlwashed
three compartmented buildings have been detected in these levels. Much evidence of manufacturing activity has been found and more advanced techniques

Against the south wall of one of the subdivided structures excavations uncovered a workshop where beads were manufactured out of soapstone. The flint drills and waste flakes, conclusively prove the presence of local industrial workshops. B e a d s were indeed found in different manufacturing stages. Beads made out of shell were also re


Fig. 4.3. Compartmented building of Period IIA. Sixth millennium BC.

Compatmented building of Period IIA (Sixth millennium BC)

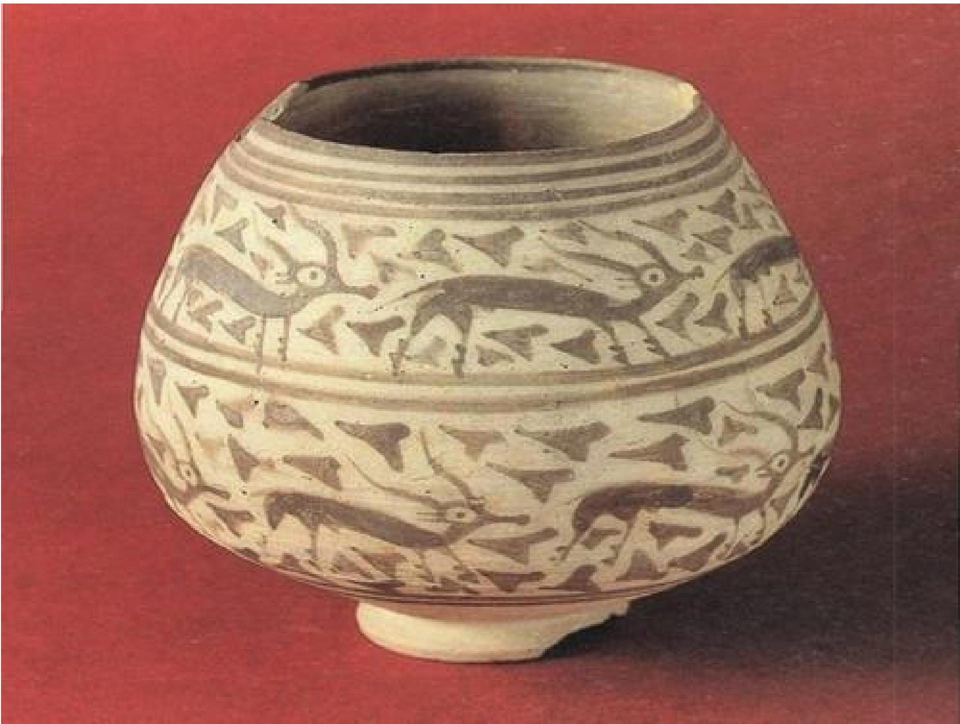
encountered in Area MR4. Period II settlement is

Period II at Mehrgarh is, for the most part

neolithic,stratified above Period I. These remains form aback to the sixth-fifthgoing

broad band of deposits that encircle the deposits of

amount becoming limited to ornaments and with more goods left with burials of females. There is further evidence important as an indication of this is th of several beads of lapis lazuli—originally from Badakshan.
barley cell units as well as in an ashy dump north of the building in large numbers. This is to be noted that this species was completely absent in the levels of Period I, i.e. aceramic neolithic. Since this variety irrigated fields, it implies an improved. method of farming in the Kachhi plains. aceramic different: "Almost all of the faunal remains that can be identified come from sheep, goat or cattle, three importance in the Middle East and South Asia today. importance evidence of the keeping of these animals by the peoples of later Period I" (26).
foundations suggest systematic storage of grains, the seeds of barley having Interestingly, this species of barley is said to grow only in irrigated fields, and thus the idea of a grain storage system in the excavate



materials for the lithic industry came as chunks square meter and movement in such a confmed from the Bolan bed. The upper levels of Period I space would have been difficult. There is also no reveal an increasing number of multi-roomed evidence that these structures served as a kind of

units separated by open spaces meant both for

f o u n d a t i o n s y s t e m o n w h i c h d o m e s t i c superstructures were raised. The fourth building tecture persist, with continued construction of com
of the complex exposed in this MR.3/ 4 AG and N
partmented buildings and domestic structures, but
with some changes.sector is preserved to a height of more than fifteen courses of mud-brick and thus cannot be
support the hypothesis that new ideas may have
interpreted as a substructure. As we pointed out for
the
come to the site along with new people. This hyppreviously exposed compartmented
pothesis is, however, not entirely valid because one
buildings, the fill in most cases is rather also observes a considerable continuity between
homogeneous, a fact that indicates that trash was
the Mehrgarh II and III occupations. Continuity from
not allowed to accumulate inside the buildings
the earlier culture is demonstrated by the occur
during their period of use. Many of the
rence of pottery similar to that found in or near a
compartmentsnumber of compartmented structures recorded inwerefilled with fallen bricks
Period II. The structures in this period are some
suggesting that several of these buildings may
what larger and more elaborate than those of Pe

have been standing empty when the upper parts
riod II but are quite similar in layout.
of the walls collapsed. We still believe that the
The middle of the fourth millennium is emerging as an important time of general change inmost
likely explanation for these buildings is that
they formed part of a storage system” (25).

the Greater Indus Region, not the least of which is Storage inthe possibility that there was a significant rise in thefacilities of this type begin population during this time. Many painted bangles,

domestic activities and burials. In the deepest
edge of the South Asian village farming community.
levels one particular room measured 2 m by 1.8
The presence of significant amounts of craft activity
m, with impressions of reed on the floor and a
in and among these buildings is of consequence
grinding stone. The walls were made of mudbecause of the diversity which includes flint knap
ping, tanning and bead making. Pottery was also
bricks of regular size (33 or 28 cm by 14.5 cm by
7 cm), which alsoprobably made at the site or very close by. Thefinger impressions.carried
presence of cotton is important, although the identi
Hearths were a common feature. There was a
fication is from seeds and the exact use of this plant limited bone-tool industry comprising mostly awls.
Stone at Mehrgarh has yet to be determined.stonevessels are rare, as are otherLarge portions of the Mehrgarh II settlement
objects, including perforated discs and spatulae
area were open and show signs of extensive use of
with incised criss-cross designs.hearths and firepits. The excavators make the fol
lowing suggestion concerning the settlement:
The appearance of chaff-tempered
pottery in Period“We have proposed that the site in the fifthappears on the sceneIBand early fourth millennium could have had the
between about 6000 and 5500 B.C. (24) and
function of, for instance, a marketplace or a craft helps in interpreting these dates. Continuity and
center where people from the uplands gathered on
change are marked with the introduction of soft,
a seasonal basis even as they do today around the
buff, chaff-tempered pottery in Period IIA. The
towns on the Kachi Plain. For the aceramic period,

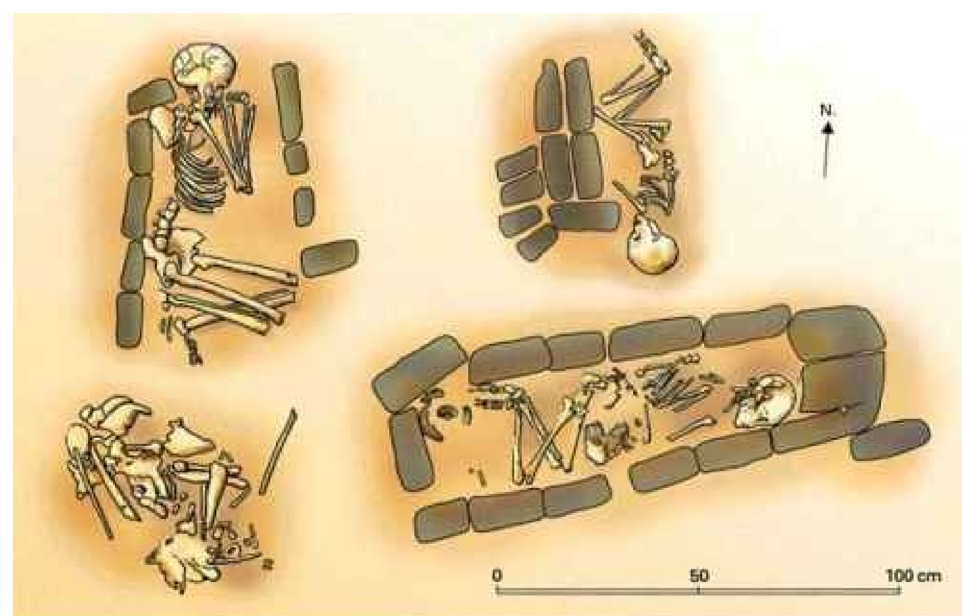
ceramic phase at Mehrgarh begins ca. 6000 BC, however, it is more difficult to propose such an exas recent stratigraphic reassessment indicates.planation since craft and marketing functions suppose the existence of a socioeconomic organization

It took a great deal of work to settle the
that does not fit our present conceptions of condi
stratigraphic picture for Mehrgarh Period I and its

tions inthat period. Nevertheless, we must entertain the idea that the fireplaces and ashyrelationship to Period II. Richard Meadow has deposits
given the following synthesis: Bricks of regular
around a core of permanent mud-brick buildings do
size (33 x 14.5 x 7 cm or 28 x 14.5 x 7 cm) were
indeed reflect the existence of temporary dwellings
used, along with other irregular sizes. They areassociated with a seasonal gathering of population generally
most probably during the winter when severe cold
bun-shaped and have finger weather pervades the uplands ...We have noted in
impressions on their tops. Some walls were thin,
previous reports that several mud-brick buildings
with only one course of bricks; others were wider
from the aceramic levels can be interpreted as storwith two or three”. Structure B is described as:
age structures, and by Period IIA, a system of store
"...6.3 m by 6.7 m, is oriented north-south,
rooms becomes one of the most conspicuous feaand is made up of six rectangular rooms. Three
tures of the site. Grave-goods also point to some
rooms measure 2.25m by 1.5m and the other degree of activity specialization while the quality of
some of the ornaments in lapis lazuli, turquoise, and
three 3.3m by 1.5m. No doorways between rooms
sea shells suggests some craft specialization as
were found even though there are two, three, or
well as a system of exchange to provide a means
four preserved courses of bricks. The walls were
for these stones to come from distant upland
sources and for the shells to come from the Arabian
made of two rows of bricks that are of various sizes. The floors of five of the rooms wereSea some 500 km away.”(25).
covered with pebbles (three rooms were
Mehrgarh Period III: The remains of Pe
completely covered with them). In several rooms riod III are found in sector MR.2, south of the original settlement. Period III is assigned to 4000 B.C.
there were fireplaces, grinding stones, mullers,
Three features of Mehrgarh III seem to characterize
bone tools, faunal remains, and flints. A polished
this period. The first of these is the size of the set
stone axe was found in one of the rooms and
tlement. Period III remains cover an estimated 170

acres (70 ha), slightly smaller than Mohenjodaro. The area is not likely ever to have been fully settled in its entirety at any one time, but it must have been a very large settlement for its day. The second distinguishing feature is further development of craft activities. The creation of new industries is not always involved, but evidence for metallurgy first appears at this time, and there is marked quantitative growth. The third feature is the evolution of the ceramic industry in Mehrgarh. It is dominated by fine red ware and wheel-made vessels, characterized by a style of painting that has come to be called “Togau”. The expansion of crafts, including the development of Togau ware, is

linear. Two kinds of archi



Burial modes at Mehrgarh VI

Period I; as agricultural production increased so did their number and sophistication. Some form of like those of Period II, have been found.
communal
storage,
or
at
least
a
system
During Mehargarh III the pottery was mass that extended beyond the needs of a nuclear family, is fi'ndings of the fragments of several crucibles that
suggested from the size of these facilities. A case
had bcen used to melt copper. Traces of the metal
can be made that these buildings may have been

still adhered to them.Two terracotta animals - one entered through the roof. No doorshave been humped bull and one dog (?) have been important

found in any of the walls and some walls are
discoveries in the field of plastic art. A disc shaped

pendant and clay rattles decorated with incised intersecting lines have also been found in these levels. Stone implements included blades, bladelets, burins, notched blades, truncated blades, borers, sickles, ring-stones and grinding stones. Bone needles and awls have also been found along with highly polished spatulas. Kitchen refuse yielded a lot of burnt bones of domesticated animals, mainly cattle.

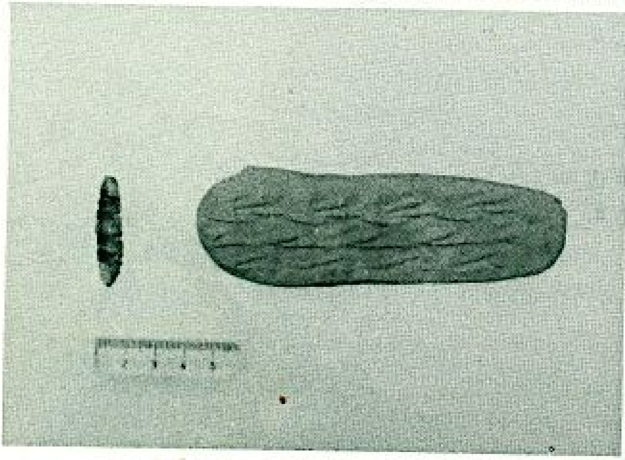
Periods IV–VI: Periods IV through VII are located on the MR.1 mound at the southern end of the site. It is an area with more stratification than other places, and this permits one some control in determining the relative chronology. There are clear signs that farmers cleared and leveled their fields, that is, pared away at the site to enhance their fields. Thus the 15 acres (6 ha) of area that are known today may have little or no relationship to the actual size of the settlement involved.


Female figurines from later periods of Mehrgarh

Period IV is dated to 3500 B.C. All the pottery of this period is wheel-thrown, sturdy and fine. The forms included fine and fragile goblets in a greenish ware, medium sized carinated jars in Wet Ware, huge jars with surface striated by curving lines made by finger pressure or heavy basins of greenish buff wares, internally decorated with parallel ridges; and one undulating ridge representing a snake. Snake depiction is a common phenomenon in Iran as it is in Balu chistan.

The evidence from Period IV onwards shows a further expansion of the settlement, diversification of agriculture and crafts, and more and better decorated pottery. In Period IV, there were larger structures, with rooms separated from each other by wide walls and doors with wooden lintels. One door, only 1.10 m high legs made its appearance. There are continuities in pottery designs between Periods IV and V. In Period VI, there were some changes - the a ppearance of a red ware decorated with pipalleaves, and a well-fired grey ware. A large pottery kiln was found in Period VI. A distinctive feature of this period are terracotta female figurines with elaborate hairstyles, heavy breasts, and joined legs, which may have had a cultic significance. Several large mounds in the Kachi plain may represent unexplored sites contemporary to the later periods of Mehrgarh.

The painted pottery in Period V consisted of three styles: one with geometric motifs painted in black, one with geometric motifs painted in two colors and the third polychrome, using red, black and



A cylinder seal in terracotta with impression, Period IIIB, 5th millennium BC, from Mehrgarh

(people must have had to bend
down to go through) led into a room
crammed with many objects such as
stone flakes, blades, grinding
stones, pestles, and many bones
Other items found in this room in
cluded a storage jar, a crushed basin
with ridges and snake designs



painted on the inner side, fine gob
lets, and beautifully painted vessels.
The pottery of Period IV included
polychrome wares. A new style of
terracotta female figurines with a tu

Male figurines appear for the first time at Mehrgarh and at the nearby site of Nosher circa 3000 BC, the period immediately preceding the establishment of urban civilization in that area. Males usualy depicted wearing a turban and standing on very straight legs and some have slit or ha;f-opened eyes like the "priest King" figure from Mohenjodaro.

bular body, pinched nose, and joined
white. Painted motifs have parallels in Kechi Beg style and Togau B style. But the range of decorative motifs at this site is much larger. Here we see the geometrization of animal patterns of Period III

pottery The caprids are slowly and gradually changed into zigzags and large open bowls are decorated by registers of loop-and-tassel motifs and horned friezes. These designs connect this site with a number of contemporary sites in Baluchistan and eastern Afghanistan, for example, Mundigak I and Amri IA. The increasing variety of pottery shapes and sizes suggests that the potters were responding to a much more diversified demand. The production of terracotta female figurines continued in more naturalistic forms.

Period V is a transitional phase at Mehrgarh and it did not last for a long period. It could be dated to the middle of the fourth millennium B.C. This period witnessed the origin of a grey ware which became very popular in later times and brought Mehrgarh on a very large canvas. The grey ware here is in the primitive stage. Red greyish pottery shows several geometric motifs, vegetal motifs and items of nature-fish, flower, proto-typesof *pipalleaf*. Seals of terracotta and bone are the first stamp seals to appear at Mehargarh. The parallels of its pottery can be seen in Togau D and Mundigak II. Polychrome decorations were, however, limited to bowls and small pots. Bichrome decorations were disappearing and monochrome decorations were commonly applied, showing the designs of 'Togau motif, lutched diamonds, broad squares, chevron motifs, etc.Here excavations have exposed buildings with wooden super structures and with large storage jars.

With period VI we reach an important phase of the third millennium. Two things are important from now on - the mass production of pottery and emphasis on figurines made of terracotta. The period corresponds with Damb Sadaat II, Mundigak III, Shahr-i-Sokhta I, Gumla II and Rehman Dheri I.

The architectural remains, belonging to this period, have been found in the central part of the main mound; due to heavy erosion only the foundations of the walls have survived. The rooms and yards are full of storage jars, complete pots, grinding stones, mortars, pestles, particularly around fireplaces floored with pebbles. An area where bases of circular kilns, built one above the other, were found, the excavators discovered thick layers of ash filled with deposits of millions of potsherds. Such bases of kilns paved with burnt pebbles, have been found in other areas also. These areas of open firing of pots and pans give definite evidence of semi-industrial productions of standardized utilitarian potteries, intended probably for a large market.

The period is marked by not only large scale ceramic production but also the emergence of new types. It also witnesses the first occurrence of the Quetta Ware profusely decorated with geometric motifs in black-on-buff which appears to have been partly inspired by the south Turkmenian Ware of Geoksyur style. Some other finds also reveal the north-western influence:
heads of flint, compartmented
leaf-shaped arrowseals in terracotta,

stone and chlorite and one double spiral headed copper/bronze pin. Beads of lapis lazuli and turquoise are, however, indigenous. It may, however, be made clear that despite the occurrence of a few Quetta motifs on buff ware, most of the ceramic productions were developed from the earlier types. *Pipal* leaves painted on red ware, palms painted on buff ware, animal designs, again show local developments.



**Many other utilitarian stoner tools shave been found, such as axes and chisel used to cut timber and to expand fields, as well as
querns, grinding stones and pestals usedd for grinding wheat and
other materials. Querns with traces of red pigment are sometimes found buried with the dead in graves**

Pottery with geometric motifs painted in black and white on red are still found in good numbers in the beginning of Period VI but almost disappears by the time the period closes. In fact, grey ware becomes the important ceramic at the site. Black painted motifs, sometimes in red also, can be seen beautifully executed on it. Vegetal designs, such as *pipalleaves* and palms are common. Animal representations are, however, remarkable. Some scenes showing humped bulls among birds pre-figure the Kulli style decoration. It is significant to note that the Quetta Ware found in large numbers in the Quetta plateau was not abundant at Mehargarh, but the Quetta motifs are found developed on open bowls and fine small pots with a much greater diversity than in the case of the rather standardized potteries of Damb Sadaat II. A set of fine canister pots made in grey ware as well as in buff ware with polychrome paintings show intersecting circles of geometric motifs sometimes filled with post-firing paintings. Such potsherds can be compared with Nal Polychrome pottery found in the cemetary of Nal. As they are limited in number, they may be considered as imported articles.

The production of female figurines also increased. In this period they were still modelled in seated position but the legs are now encircled by a coil of clay, the face bears goggled applique eyes and large coils of clay on each side of the face give the impression of fantastic hairdress, the torso is rendered more realistic by being modelled with pendulous breasts that are partially concealed by multistrand necklaces. A few terracotta bulls have also been found. In the upper levels of this period, wild boar has been discovered. The metal finds are very limited. Besides one chisel and one flat axe, we have only shapeless fragments. Stone implements included blades, bladelets, microliths-lunate, triangles, trapezes, sickle blade, truncated blades, burins, scrapers. Bone awls have also been reported but in a limited quantity.

Period VII and VIII: The archaeological story of the Kachhi plain does not end with Period V or VI. The developments at Mehrgarh are taken up by Nausharo, a site belonging to the Indus Civilization, Sibri and Pirak which covers the transition to the Iron Age. In this chapter we are primarily concerned with a time frame between the seventh millennium BC to the middle of the third millennium BC, that is, from Period I to Period VI. The last two periods may not be of our direct interest but they could be instructive in showing the continuity of occupation and the direction of cultural change.

The excavation of these sites allows the Indus Civilization to be linked to the cultures which preceded it since the Neolithic and the ancient Chalcolithic times. The excavation of the Harappean layers led to the uncovering of a settlement which met the criteria of the urban civilization of the Indus, with

discrete rectangular zones, and with the existence of baths and hydraulic study of Harappean ceramics in brought to light a clear stylistic evolution over time, thus contradicting the theories claiming that Harappean pottery had remained static for several centuries.

Period VII represents the last occupation at Mehrgarh and is dated from 2700 B.C. to 2500 B.C. which precedes the Harappan colonization of the region. The remains belonging to this period have been found in the southern part of the main mound and correspond to two successive phases.The early phase of this period witnessed the monumental structure of a mud-brick platform; in the later phase the area, which now overlooks the platform was occupied by intricate buildings among which many storage rooms were found filled up with storage jars and sets of complete pots. The most significant find is however the Kot Dijian pottery. The occurrence of several fragments of jars in a micaceous ware and decorated around the neck by painted bands in the upper-most layers of the main mound possibly features. The

Nausharo has shows that the ware was of pre-Harappan origin. Several new elements, such as carinated bowls in sturdy buff ware with nail headed rims, long parallel sided blades, potsherds with cut-out designs, shallow dishes with lunar shaped design connect Mehrgarh with the arrival of the Hardpans or their culture at a nearby site known as Nousharo

This period has seen the production center of the terracotta human figurines on a massive scale. Thousands of fragments, mostly arms and legs, and some specimens that are intact or nearly so, have been collected. The figures are no longer seated, they stand uprootght. The head remains stylized with goggled eyes and beaked noses but for the rest the modeling is more naturalistic than before. The female figurines exhibit a wide range of hairstyles, painted in black, and ornaments painted in yellow. These figurines are similar to Zhob mother goddesses. Male figurines also appeared. They have a large turban and a neck-tie shaped pendant Terracotta animal figurines of good workmanship represented a humped bovine, the Zebu, wild pigs and various birds. A unique find is the figure of a ram carved from alabaster. Many stamp seals have been unearthed. Most of them are made out of terracotta. One of them bears the figure of a running Zebu bull. The majority of the stamp seals are circular in outline

The lithic industry survived at the site till the middle of Th.e third millennium B.C. Flint implements included blades, blade lets, microliths, sickle elements, lunates, triangles, trapezes, burins, scrapers and drills. Laurel-leaf shaped arrowheads are also associated with this period.

Archaeological discoveries in northern Afghanistan, Central Asia, and eastern Iran have revealed that cultural interaction between Mehrgarh and these regions existed in all of its developmental periods. These interactions intensified in Period VIII. With the discovery of the South Cemetery at Mehrgarh and the nearby site of Sibri, we know that the Greater Indus Valley was also part of this vast interaction zone. Excavations overseen by Marille Suntan in 1979,1980, and 1981 seasons have provided evidence for close cultural relations between the Murghab-Bactrian area and the Kachi plain. A number of artifacts similar to those found in Central Asia were recovered, a fact which helps to account for ‘foreign’ or non-Baluchi’ cultural features previously noted at Pirak.

V.2. Subsistence Economy



By far the best evidence for subsistence economy of an early agricultural village in S o u t h A s i a c o m e s f r o m Mehrgarh, ca. 7000 B.C. For the next two to three millennia the evidence of this type of agriculture seems to be limited to Baluchistan, and by the end of this period it is found spread all over its major areas, such as the Zhob valley in the northeast, the Quetta valley and the Kalat plateau in the central section, the Las Bela plain on the coast and the valleys in the

hills which come down to it from the Kalat side, and the Kej valley to the north of the coastal ranges of Makran.

The Kachi plains in Mehrgarh is located, have which contributed to the appearance of early farming economy in the region. Located at the edge of the barren ranges of inner Baluchistan, the small valleys consisting of fertile alluvium brought by the streams from the hills and perennial river systems made irrigation easy on stretches of land around the Bolan River and its several tributaries.

The subsistence regime at Mehgarh seems to be connected with that of Afghanistan. In northern Afghanistan, caves occupied by hunters and gatherers contained the bone remains of wild sheep, cattle and goat. Evidence for domesticated sheep and goats begins to appear in the archaeological record at several locations in the region. It is believed that the Central Asian region of the present-day Tajikistan, Uzbekistan, western Tian Shian, and its peripheries, comprising Afghanistan, the western regions of Pakistan, northern Punjab, and Kashmir, were probably the original places of bread-wheat and spelt-wheat cultivation and the area around Mehrgarh was probably the nucleus of this vast complex (27).

Constantini (45) and Richard Meadow (26) fielded reports of floral and faunal remains, respectively, from Mehgarh; A great deal of information has thus become available on the subsistence regime of the people of the early Neolithic of Pakistan at and around Mehrgarh thanks to Constantini (45) and Richard Meadow (26) who fielded extensive reports of floral and faunal remains, respectively, from Mehgarh. These reports have already been

Baluchistan, where several advantages discussed in the last chapter in details; the following material may seem a repetition. In any case, it may serve as a consolidation of material evidence.

The Natural Environment of Mehrgarh: One of the major contributions of Mehrgarh has been to provide us with the earliest evidence of an incipient farming economy in South Asia in a region whose geographical location is of a high significance. The Bolan Basin is situated at the southeastern limit of the distribution area of the wild ancestors of the elements which, later on, were to be predominant among the domesticated species - goats, sheep, cattle, barley and wheat - exploited in the course of the Neolithic period. The site of Mehrgarh stands on the margins of foothills, in an alluvial as well as riverine environment. From the hills culminating at about 2000 meters above the sea level to the alluvial plain less than 100 meters above the sea level, successive ecosystems provide different resources, which could be exploited within a limited mobility. Seams of flints and bitumen have been located in the Bolan Pass. For instance, near Gokhurt, almost at the foot of the Bolan Pass, the ground around the bitumen spring is strewn with flints.

When in the 1920's Sir Aurel Stein conducted his surveys in Baluchistan, he spotted so many prehistorical sites that he concluded that the region must have enjoyed better climatic conditions in the past than today. Such an assumption was later on discarded by most of the specialists who thought that the present arid situation must have prevailed since the prehistorical periods. But more recently several studies, including pollen analyses in sediments from lakes, have shown that in many parts of the world the climatic conditions have been subjected to changes in the course of the last 10.000 years. In the case of the Bolan area, Lorenzo Costantini and Alessandro Lentini have carried out palynological investigations Nausharo. They collected columns in the Neolithic deposits (Period I).

The preliminary results of their work have been published in a contribution for South Asian Archaeology 1997. Their conclusion is that "in the Mehrgarh pollen record there is a great deal of evidence which might be interpreted as relevant data for wetter environmental conditions." The results of the pollen analysis show that, from the beginning of the Mehrgarh occupation till the 4th millennium BC, " the region was probably dominated by a semilacustrine or humid environment with a riparian at Mehrgarh and at

samples from several vegetation, characterized by Populus, Salix, Fraxinus, Ulmus and Vitis, associated in a typical hydrophitic complex, arranged in dense gallery forests."

For the time being, other pollen records from Baluchistan or from the Indus valley are lacking. Nevertheless, the evidence from Mehrgarh is, to some extent, consistent with the Holocene environmental changes noticed in the sediments from the Lunkaransar, Didwana and Sambhar paleolakes in the Thar Desert. Such lakes kept permanent water from 10.000 to 4.800 BP, before desiccating when the water table went down. We can recall here the recent work of Giosan et al (53) that stipulates a decidedly wetter climate in the early parts of the Holocene, getting gradually drier till it reached a level of the present.

The Kachi plain, where Mehrgarh is located, was also not bad from the irrigation point of view. Numerous non-perennial watercourses dot this area, and dams were put across their courses to make them overflow and make agriculture possible. Another important point to note is that this area is close to the entrance of the Bolan Pass from the Indus side. Mehrgarh itself is located on the Bolan River, a perennial stream that drains out of the highlands of Baluchistan into Kachi. It is a rich alluvial area, with adequate water resources for agriculture.

The Subsistence Pattern: Though the exact dating of the beginning of the settlement is still difficult to assess, the first levels of the Neolithic period at Mehrgarh provides us with the first evidence of the progressive setting of a farming economy in South Asia. The evidence leads us to as early as 7^{th}, even 8^{th} millennium BC. In the foregoing pages, especially in Section V, we have taken into account two types of evidence: floral and faunal. Here we consolidate those discussions in brief.

Floral Evidence: Somewhat surprisingly, the collection from Period I, dating to *ca.* 7000 BC, is especially rich and complex. Most of the evidence comes from thousands of impressions in the abundant mud bricks of the period. The dominant plant in the floral assemblage of Period I is naked six-row barley *(Hordeum vulgare* subspecies *vulgare).* More than ninety percent of the seeds and imprints were identified as this plant. Also present is two-row barley (*H. vulgare* subspecies *spontaneum*), einkorn (*Triticum monococcum*), emmer (*T turgidum* subspecies *dicoccum*), and hard wheat (*T turgidum* cf. conv. *durum*) present in greatly reduced amounts.

Lorenzo Costantini has also pointed out the sphaerococcoid form of the naked-barley grains with a short compact spike with shortened internodes and small rounded seeds. According to him, such characteristics in the aceramic Neolithic levels can be ascribed to probably cultivated but perhaps not fully domesticated plants. According to Zohary, quoted by Richard Meadow, the distribution of wild barley extends today to the head of the Bolan Pass. It is therefore likely that local wild barleys could have been brought under cultivation in the Mehrgarh area. Costantini has also identified a small amount of domestic einkorn (hulled: *Triticum monococcum*), domestic emmer (hulled: *T. turgidum subsp. dicoccum*) and a free-threshing form which can be referred to as *Triticum durum.* So far no morphological wild wheat has been identified in Baluchistan or anywhere else in South Asia. Therefore the small amount of wheat seeds at Mehrgarh, Period I, needs further explanation since obviously wheat has not a great significance in the agricultural activities of the aceramic period.

The non-cereals so far identified for the period include the Indian jujube (*Zizyphus sp.*) and dates (*Phoenix dactylifera*), represented by stones in an upper level of Period IB as well as Period lIB (45). It is interesting that the einkorn and emmer disappear from use in the region, but the bread wheat and shot wheat continue on as the eastern species of *Triticum.* Richard Meadow has observed that probably the free threshing wheat in the west was *Triticum turgidum cf. conv. durum* (hard wheat) and *Triticum aestivum, bread* or club wheat in the east.

Staple crops of Neolithic Baluchistan have been described in Section IV in some details. The following remarks, specific to Mehrgarh, should be considered as complementary notes.

Barley: From analysis of the Mehrgarh materials it was possible to determine that the type of barley present at the site showed some characteristics that can be called 'local'. Biometrical study of the impressions and charred remains indicated that the dominant type of naked barley had a short, compact spike with shortened internodes and small rounded seeds. These characteristics, which in the

aceramic Neolithic (Period I) can be ascribed to cultivated but perhaps not completely domesticated plants, are very marked in charred barley seeds of the subsequent Periods II and III.

Naked six-row barley seems to have been the principal crop to supply the straw used to make mud-bricks during the aceramic Neolithic at Mehrgarh, just as it was at Beidha, Ali Kosh, and Hacilar in the Near East at the beginning of the seventh millennium BC. But in those three 'Fertile Crescent' sites, the amount of naked barley retrieved was rather small and only at Ali Kosh did Helbaek find sufficient material to be able to affirm that naked barley constituted a distinct variety, even if only in a ratio of 1:10 with hulled barley.The naked barley from Mehrgarh, however, for morphological and biometric reason, has better parallels to charred remains recovered from archaeological deposits in southern Turkmenia, dating at least as early as 4000 BC.

The naked barley from Mehrgarh does not seem to have found any effective competition from other barleys. Impressions of wild and *distichum* barleys together represent just 2.5 per cent, and hulled six-row barley about 1.8 per cent. These proportions remain practically constant in all periods at the site, and only in Period VII (third millennium) does hulled barley seem to show a modest percentage increase in comparison with naked barley (45).

Wheat: It is interesting to note that naked wheat is present, although in very modest percentages, together with typical hulled varieties, in the oldest deposits examined from the aceramic Neolithic at Mehrgarh. This combination of wheat species, although differing in relative proportion from one region to the next, seems to be the dominant crop on the majority of Neolithic and chalcolithic sites of Transcaucasus, Armenia, Moldavia, and southern Turkmenia (45). At Mehrgarh the hulled wheats,*Triticum monococcum* and *Triticum dictum*, continue through to Period VII, a feature which suggests that these forms could have had some importance in the agricultural landscape of the region. But while the remains of these hulled taxa remain low in frequency, naked wheat, although present in proportion of less than one percent in the aceramic Neolithic, increases in frequency in Period II and dramatically in Period III. The increase continues into Period VIII and coincides with the slow but progressive decrease in the proportion of naked barley.

Richard Meadow (28) summarizes the evidence from Mehrgarh thus: in Period I (impressions only), naked wheat which can be referred to as *Triticum durum* is present; in Period II (impressions and charred seeds) the morphology of the seeds, while being within the range of variation of the tetraploid *Triticum durum*, shows characteristics of small-seededforms; in following periods, morphological and biometrical characteristics permit us to group the great majority of the wheat seeds with the hexaploid form *Triticum sphaerococcum.* This evidence thus suggests a shift toward sphaerococcoid form. Not only does the morphology of the tetraploid wheat, which is probably dominant in Period II, seem to shift toward a sphaerococcoid form, but the hexaploid form dominant from Period V onwards also has a remarkable proportion of *Triticum sphaerococcum.*

Genetic studies seem to confirm the possibility of morphological convergence between tetraploid and hexaploid wheats. A radiation-induced mutation in *Triticum durum* selected by A. Bozzini (43) confirms the possibility of obtaining forms morphologically quite similar to the hexaploid *Triticum sphaerococcum.* This mutation, called 'sphaerococcoid in Bozzini's experiments, involves changes in all of the plant's organisms, including the seeds which assume the characteristic rounded form. Although at Mehrgarh we are dealing with fossil materials which are not easily evaluated from the genetic point of view, the possibility of these morphological and biometrical variations or

convergences in wheat, combined with the frequency of sphaerococcoid forms of barley, would seem to indicate the presence of conditions in the Kachi region during prehistoric times which favored these rounded types of grains.

An interesting observation on the subsistence regime of these times comes from the paleobotanical remains of Period II at Mehrgarh: "The charred seeds of wheat and barley belonging to the species *Triticum sphaerococcum* and *Hordeum sphaerococcum* that, according to L. Costantini, grow only on irrigated fields, also were collected from the ashy layers of Period II" (25). This is important documentation for the beginnings of local irrigation, not the huge, community or state sponsored works thought to have massive social impact that were used to move water between major environmental zones. The Mehrgarh evidence reflects the common sense of farmers attempting to make the best use of their soil and water resources on a local, family level.

Other floral remains: While wheat and barley were doubtless the principal crops at Mehrgarh, they were not the only elementary resources of vegetal origin (26). Other items in what was, in fact, quite a varied diet include *Zizyphus* fruit, stones of which have been found in all periods. Beginning with Period V grapes appear which, unlike the native *Zizyphus,* seem to have been introduced into an environment not included in the natural range of the plant. The study of the pips found at Mehrgarh has excluded the presence of wild grapes, confirming that grapes were introduced into the area following the development of cultivation techniques elsewhere. Two stones from the fruit of the date palm *(Phoenix dactylifera)* have also been found (in areas MR3 and MR4, Periods I and II).

The cotton *(Gossypium* sp.) seeds found next to a compartmented building of Period II are also perplexing. These seeds, which together with the date stones represent the most ancient finds of these taxa associated with human settlement, are unique occurrences which can be fully evaluated only with further research, including study of material from other sites in the same region.

Faunal Evidence: The faunal remains from Mehrgarh are highly significant in that they demonstrate the progression from a hunting-collecting to a food-producing economy. In the aceramic neolithic the predominant animal remains are those of wild species, particularly gazelle, while sheep or goat are markedly less numerous and cattle - whether wild or domesticated - are still less frequent. Thereafter, in successive stages, the position changes: gazelle becomes less and less common, and sheep and goat and later zebu cattle increase in frequency, until these three domesticated species assume proportions in the economy comparable to those which they hold to this day.

The process of domestication is more obvious in the case of animal remains. There does not seem to be any doubt about the domestic status of at least some of the goats which are the most common animal type after gazelle in the first level. Moreover, young goats were found placed in some of the burials of this period. Regarding sheep and cattle, their increasing occurrence and decreasing body size throughout the successive levels of Period I strongly support the hypothesis of their local domestication. The change in the size of sheep

that naked barley constituted a distinct variety, even if only in a ratio of 1:10 with hulled barley.The naked barley from Mehrgarh, however, percent in the aceramic Neolithic, increases in frequency in Period II and dramatically in Period III. The increase continues into Period VIII and

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better parallels to charred remains recovered from continued through Period II as well.
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Periods I and II, there should not be any doubt
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cent, and hulled six-row barley about 1.8 per cent. other North-South. Between houses, open spaces
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This layout with itsall periods at the site, and only in Period VII (third
In Period IA the animal economy is domi
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modest percentage increase in comparison with
(Gazella dorcas), swamp deer naked barley (28).
(Cervus duvaucelii), nilgai *(Boselaphus tragocame*
lus),
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Western and Central Asia, where the houses cluster
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(Ovis orientalis), wild goat *(Capra aegagrus)*,present, although in wild tightly together and where there is no evidence
for cattle
(Bos namadicus),
wild pig
very *(Sus scroia)*modest and
alleys, doorways or large open spaces. The plans of
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Mehrgarh I exploited the Kachi Plain itself as well as hullled the houses from early villages so far recorded in the varieties, in

Neolithic of Western or Central Asia often show deposits numbers of fish and bird remains suggests that theexamined from the rather irregular combinations of small cubicles of aceramic Neolithic atBolan River and the lake/swampy environments

various sizes.associated with it were of little importance to them"



By the end of the aceramic period the faunal assemblage is quite different from the one just

The subsistence patterndescribed in that almost all of the faunal remains

Though the exact dating of the beginning of the settlement is still difficult to assess, we can say that the first levels of the Neolithic period at Mehrgarh provides us, as early as the 8th millennium BC, with the first evidence of the progressive setting of a farming economy in the north-western part of the Indo-Pakistani subcontinent.

in the proportion of naked barley. percentages, that can be identified come from sheep, goat or cattle, three of the domestic animals of principal importance in the Middle East and South Asia today. The very fact of their overwhelming importance in the

the so far recorded seeds and imprints.onaceramic Neolithic at[7] He has
of these animals by the peoples of later Period I.

also pointed out the sphaerococcoid form of the
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naked-barley grains with a short compact spike with have undergone because of peculiar local shortened internodes and small rounded seeds.
ecological and breeding conditions. The evidence

According to him, such characteristics in the aceramic

They also come to domin can be referred to as *Triticum durum*
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hulled six-row barley (
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R.H. Meadow,9evidence thus suggests a shifdom toward sphaero- the distribution of wild barley extends quoted by scoccoid form. Not only does the morphology ofe stication of



Fig. 5.5. Impression of spikelet of einkorn-emmer from MR3.



Fig. 5.6. Impression of spike identified as emmer, from MR3T.

Impression of spikelet of einkorn wheat from MR3, Pe

today to the head of the Bolan Pass. It is thereforecattle at Mehrgarhlikely that local wild barleys could have been brought needingunder cultivation in the Mehrgarh area. Costantinistrong,
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free-threshing form which can be referred to asThe long-distance interaction called

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Lorenzo Costantini has shown that the plant Mehrgarh, Period I, needs further explanation sincedocumented by



Fig. 5.5. Impression of spikelet of einkorn-emmer from MR3.



Fig. 5.6. Impression of spike identified as emmer, from MR3T.

assemblage of Period I is

dominated by naked six

Two spikelets of naked six-row barley from MR3

row barley which accounts for more than 90% of



Fig. 5.1. Two spikelets of naked six-row barley from MR3.



Fig. 5.2. Cast of the impressions shown in Fig. 5.1.



Fig. 5.3. Impression of a barley spike, almost whole. Surface of a mud-brick, MR3.



I

obviously wheat has not a great significance in the

mpression of spike identified as emmer wheat, MR3, Pe implied by the

pre agricultural activities of the aceramic period.shell s , l a p i s la

Besides hunting activities, there is also eviAfghanistan anddence of animal husbandry, first limited to goat. In a

few graves from the earliest levels (II and III), five

complete skeletons of kids had been disposed in aturquoise (Iran and

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presence of bones of relatively small subadult and

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adult animals in the trash deposits of the early lev unaware of the els confirms, according to R.H. Meadow, the dobodies"

mestic status of at least some of the goats. Meadow

has also clearly shown that " though in the course pecially



them, es

of Period I at Mehrgarh, the remains of sheep and

cattle became to increasingly dominate the faunalnorth, south and westassemblages of the successive strata, at the same

Fig. 10 : Period I: Imprints of barley (Hordeum vulgare)(L) and wheat (Triticum dicoccum) (R). © L. Costantini
Impression of a barley spike, almost whole, MR3, Period I, 6000-7000 BC (
after Costantini
)
time, the animal represented grew smaller in body

size". By the end of Period I, cattle bones amount for over 50% of the faunal remains. Osteological

142 330

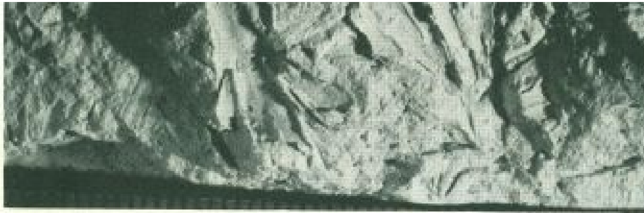


Fig. 5.1. Two spikelets of naked six-row barley from MR3.



Fig. 5.2. Cast of the impressions shown in Fig. 5.1.



Fig. 5.3. Impression of a barley spike, almost whole. Surface of a mud-brick, MR3.



Fig. 5.4. Impression with the charred fragment *in situ*. Naked six-row barley, MR3.

in Period II, seem to shift toward a regime of these times comes from the assume the characteristic rounded form. Although ment not included in the natural range of the palaeobotanical remains of Period II at Mehrgarh:at Mehrgarh we are dealing with fossil materials sphaerococcoid form, but the hexaploid form

plant. The study of the pips found at Mehrgarhcharred

which are not easily evaluated from the genetic

has

excluded

A Prelude to Civilization wild *sphaerococcum*.

mals. Over time the potential domesticates come to

possibility of morphological convergence between

look like domesticated animals (smaller, with the tetraploid andhallmarkshexaploidofwheats. Adomesticatedradiation-beasts).

induced mutation in

Triticum durum

selected by A.

They also come to dominate the animals resources Bozzini (Bozzini, A. 1965. Sphaerococcoid, a

radiation-induced
mutat
i
o

used by the early inhabitants of Mehrgarh; somen
i
n
Triticum
durum
thing we would expect in the early-mature stage of
Desf., in The use of induced mutation in plant food production. Thus, the local domestication of *Botany* 5, sheep, goats and cattle at Mehrgarh is reasonably 375-85) confirms the possibility of obtaining forms
strong, needing confirmation from other excava
morphologically quite similar to the hexaploid
T r tions, but a very good story in and of itself. *u m*

sphaerococcum. This mu tation, called 'sphaerococcoid in B o z z i n i ' s experiments, involves changes in all of the plant's organs, including the seeds which

the remarkable proportion of presence of *T r i t i c u m* grapes, belonging to the species
and *Hordeum sphaerococcum*

L. Costantini, grow only on irrigated fields, also were collected from the ashy layers of Period osteological II" (Jarrige, Jarrige, Meadow and Quivron 1995: 318). This beginnings community or state sponsored works thought to have massive social impact that were used to breeding, Supplement to *Radiation* move water between major environmental zones. The Mehrgarh sense of farmers attempting to make the best use *i t i c* of their soil and water resources on a local, family level.



assume the characteristic rounded form. Although at Mehrgarh we are dealing with fossil materials which are not easily evaluated from the genetic

Date stone from Mehrgarh 3, Period I, ca. 6500 BC

Other floral remains: barley were Mehrgarh, resources of vegetal origin (26). Other items in what was, in fact, quite a varied diet include *Zizyphus* fruit, stones of which have been found in all periods grapes appear which, unlike the native seem to have been introduced into an environ ment not included in the natural range of the plant. The study of the pips found at Mehrgarh has excluded

studies as well as clay figurines indicate that zebu cattle (*Bos indicus*) is well attested in Period I and became most probably the dominant form. Mehrgarh provides us therefore with a clear evidence of an indigenous domestication of the South Asian zebu. We know today that *Bos indicus* and Bos *Taurus*, the non-humped bull from the MiddleEast, have a different genetic origin. Therefore the assumption that farming economy was introduced full-fledged from Near-East to South Asia needs to be questioned.

Meadow has made the following important points concerning the subsistence economy of early Mehrgarh (26):

• Goats were kept from the time of the first occupation of the site.

• Cattle and sheep are likely to have been domesticated from local wild stock during the course of the aceramic neolithic.
• Size diminution in goats was largely complete by Period IB (5300 BC at the latest), in cattle by Period IIA, and in sheep perhaps not until Period III.
• The contribution of domestic or "pro-domestic" stock to the faunal assemblages came to surpass that of other animals early in the aceramic, but not in the earliest levels.

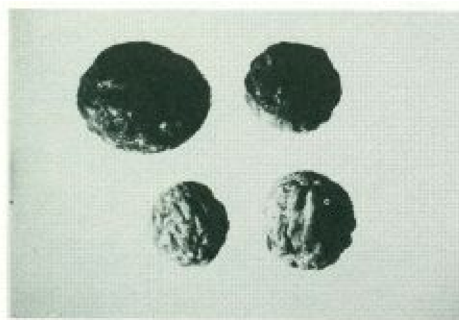


Fig. 5.7. Fruit stones of *Zizyphus* sp. from MRK.

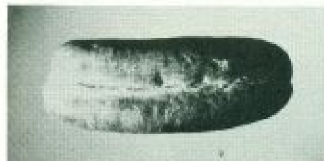


Fig. 5.8. Date stone from MR3.

• The development of animal keeping by the an

cient inhabitants of Mehrgarh took place in the
o f
v i e w,
t h e
context of cereal crop cultivation, the building of
p o s s i b il i t y o f t h e s e confirming that grapes were introduced into the and
substantial mud brick structures, and the exis
biometrical variations area following the development of cultivation in
tence of social differentiation and long distance or
wheat,

trade networks. combined with the techniques elsewhere. Two stones from the fruit of sphaerococcoid The dependence on domesticated animals forms of barley, of the date palm *(Phoenix dactylifera)* have also would seem to indicate the presence of conditions continued to grow, as did the reliance on cultivated been found (in areas MR3 and MR4, Periods I

in the Kachi region during prehistoric times which plants. Meadow has noted that it is now clear that and II).



Fig. 5.7. Fruit stones of *Zizyphus* sp. from MRK.

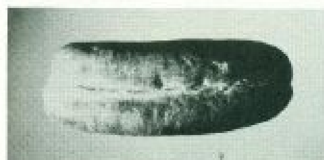


Fig. 5.8. Date stone from MR3.

cattle (the humped South Asian zebu) were locally domesticated at Mehrgarh. He goes on to note:

• Sheep are likely to have been domesticated from local wild stock during Period
• Goats were kept from the time of the first occupation of the site.
• Diminution in goats was largely complete by late Period I, in cattle by by Period II, and in sheep perhaps not until Period III.
• The contribution of domesticated stock to the faunal assemblages came to surpass that of other animals early in the aceramic, but not in the earliest levels.
• The development of animal keeping by the ancient inhabitants of Mehrgarh took place in the context of cereal crop cultivation, the building of substantial mud- brick structures, and the existence of social differentiation and long distance trade networks as attested by the presence of marine shells, lapis lazuli, and turquoise in even the earliest graves.

Early Neolithic at Mehrgarh in Context with the "Nuclear Zone": What we see at Mehrgarh is a sequence of events that seems to document the local domestication of animals. The sheep, goats and cattle start out looking wild, and were manipulated in the way we believe people at the threshold of food production treated their ani

Fruit stones of Zizyphus sp. From Mehrgarh I (ca. 6000 BC)
p o i n t

Meadow stresses that the local domestication o f v i e w, t h e p o s s i b i l i t y o f t h e s e of animals took place within the context of fairly ad
morphological and biometrical variations or vanced cereal agriculture, with domesticated wheat
convergences in wheat, combined with theand barley. We do not know how deep this side of

frequency
of
the food producing economy might go in the eastern
sphaerococcoid forms of barley, would seem to indicate the presence of conditions
parts of the "expanded nuclear zone" but notice can

in the Kachi region during prehistoric times which be made of the cereal pollen and early burning favoured these rounded types of grains.
noted by G. Singh in the lakes of Rajasthan, as

early as 7500 B.C. (16) as well as the fact that wild barley has been found in Baluchistan and Afghanistan.

The long-distance interaction called for by the notion of an "expanded nuclear zone" in Middle Asia is documented by the trade network implied by the presence of marine shells, lapis lazuli (found in Afghanistan and Baluchistan) and turquoise (Iran and Central Asia), noted by Meadow. The people of Mehrgarh IA were not isolated "home bodies" unaware of the world around them, especially the

confirming that grapes were in area following techniques elsewhere. Two stones from the fruit of the date palm been found (in areas MR3 and MR4, Periods I and II).

world to the north, south and west-theother parts of

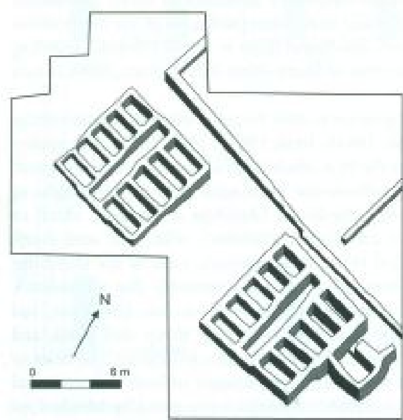
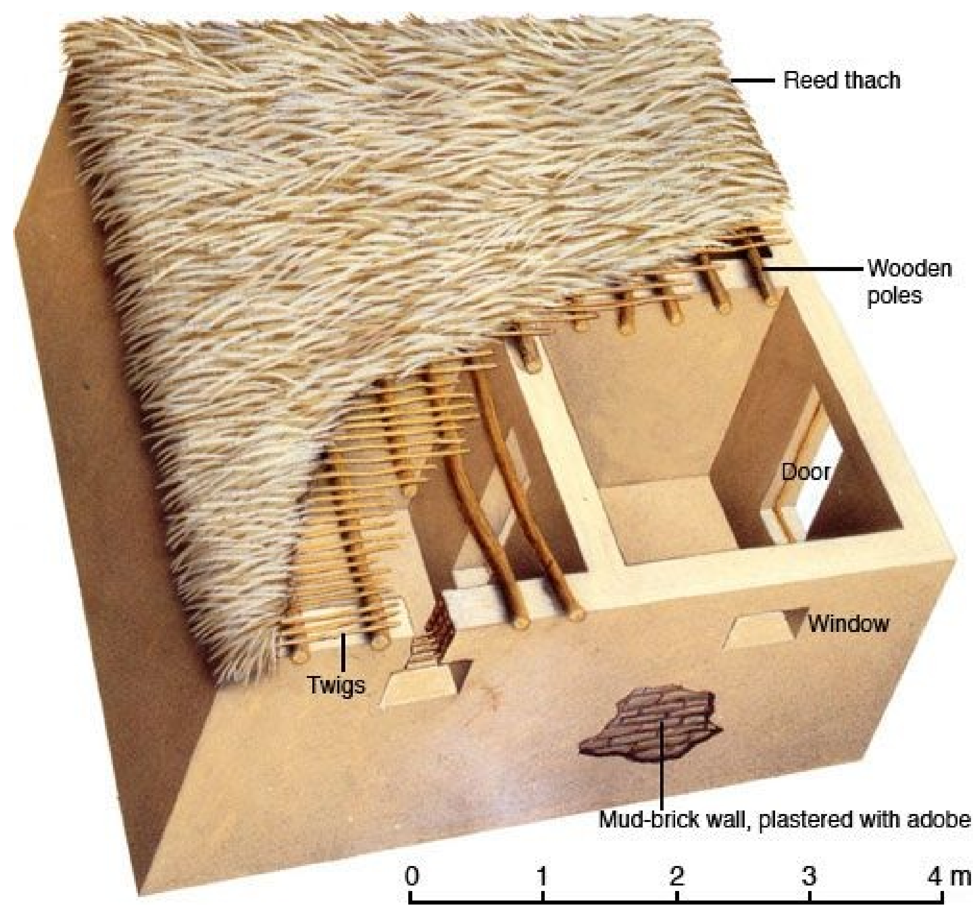


Fig. 5.3. Mehrgarh: buildings of Period IB, fifth millennium BC (after Jarrige, 1984: fig. 4.1)

the "expanded nuclear zone."

Jean-Francois Jarrige has recently remarked: ...in the past a Mediterranean type of vegetation could have descended to the base of the Balochistan piedmont. In any case, it is clear that the vegetation cover of the Bolan Basin has evolved through time. One can now no longer eliminate the possibility that this region had an herbaceous cover in the past very different from that of today, including, in particular, the wild cereals, specimens of which we find in the deep levels of the neolithic. The existence of such a vegetation cover could have pro vided the milieu for mutations and spontaneous hy bridizations among various cereals. The presence of small amounts of bread wheat or of sphaerococ coid wheat and barley could be explained as their being weeds in the fields of barley with still only slightly domesticated characteristics (8).

In short, a good case can be made that the people of Mehrgarh were participating in the early stages of the food producing/domestication revolu tion. The strong evidence for local involvement in the shift of the animal economy from "hunting to herding" and the participation in interregional com munication give us good reason to believe that fur ther work in the region around Mehrgarh will tend to support the hypothesis put forth in Section V: there was a single expanded nuclear zone" in Middle Asia within which food production and domestication took place within a single period of time; from about 11,000 BC to 5500 BC. In the Near East this would encompass the period beginning with the Natufians



through PPNB. We have no established terminology for the period in the eastern part of the "expanded nuclear zone”.

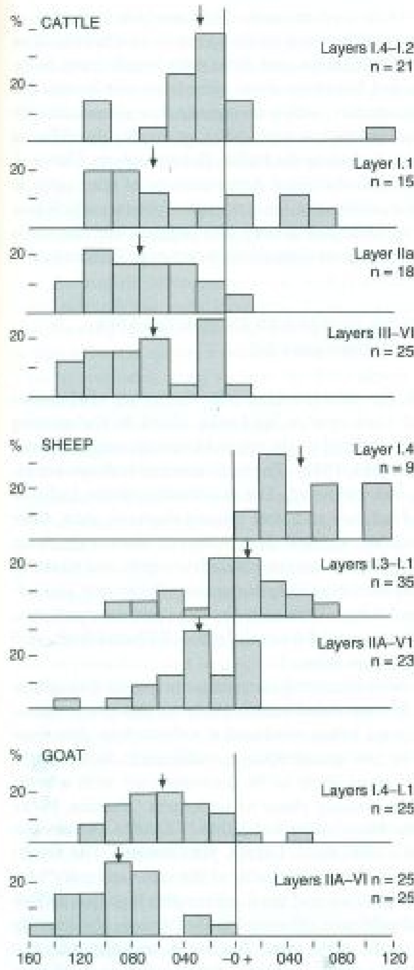


Fig. 5.5. Size changes of cattle, sheep, and goats at Neolithic and Chalcolithic Mehrgarh, plotted according to the difference of logarithms technique (the arrows mark the median size); the older (Neolithic) layers are at the top of each bar chart. Cattle decrease rapidly in size at the beginning of the sequence and then stabilize; sheep decrease dramatically and consistently over time; goats remain relatively stable (after Meadow, 1984*b*: fig. 6.3 and 1986: figs. 1, 2)

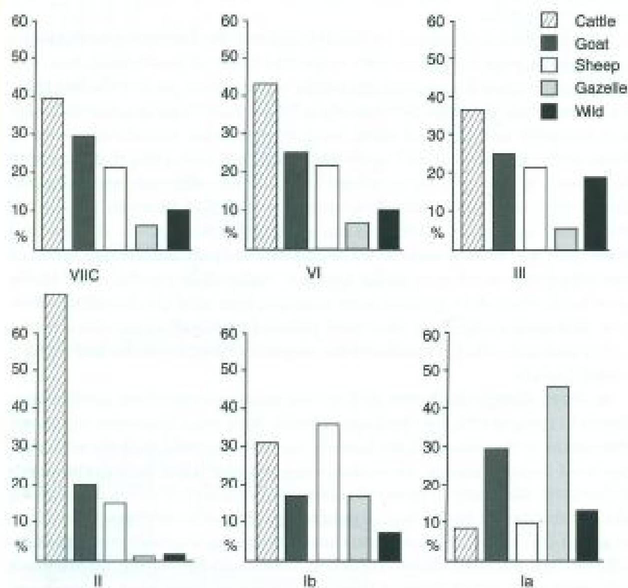


Fig. 5.4. Changing frequencies of fauna at Mehrgarh; VIIC to Ia refer to phases of the site's occupation (after Meadow, 1989*b*)

Changing frequencies of fauna at Mehrgarh: Ia to VII refer to the occupation periods (after Meadow)

As discussed in Chapter V.5, within the "expanded nuclear zone" (at least many of them) were

experimenting with their subsistence economy, seeking ways to better control the vagaries of production through the husbanding of animals and the

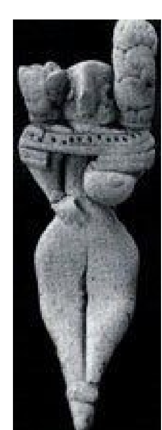
Size changes of cattle, sheep, and goats at Neolithic and Chalcolithic Mehrgarh,plotted according to the difference of logarithms technique; the older layers are at the top of each bar chart. Caviled decrease rapidly in size at the be ginning of the sequence and then stabilize; sheep decrease

dramatically and consistently over time. Goats remain rela tively stable. (*after Meadow***)**

management of plants. These experiments were many, some successful and of these successes some more successful than others. Seen in hind sight some must have been failures, possibly devastatingly so in some cases. The communication within the "expanded nuclear zone" was generally rich. This was driven in many ways. Some of these would have been 1) trade in material goods, raw materials and finished products, 2) 'the presence of marriage and other social networks such as systems of exchange founded in reciprocity and ecological mechanisms for spreading risk and forming alliances, 3) the maturation cycles of plants and animals, new patterns of movement and communication implied by the emergence of food production and domestication. The richness of this communication, and the diversity of these mechanisms of antiquity, are of course, poorly documented today; but there are hints, there is an underlying logic, there is enough for an hypothesis to be put forward that has sufficient substance for it to be tested, rather than dismissed.

Conclusion: What we see at Mehrgarh is a sequence of events that seems to document the local domestication of animals as well as the adoption of already domesticated plants and animals. The sheep, goats and cattle start out looking wild, and were manipulated in the way we believe people at the threshold of food production treated their animals. Over time the potential domesticates come to look like domesticated animals (smaller, with the osteological hallmarks of domesticated beasts). They also come to dominate the animals resources used by the early inhabitants of Mehrgarh; something we would expect in the early-mature stage of food production. Thus, the local domestication of sheep, goats and cattle at Mehrgarh is reasonably strong, needing confirmation from other excavations, but a very good story in and of itself.

V.3. Technology and Crafts



slabs were found covered with red ochre. In the central corridor of this building was a well preserved

elephant tusk with three grooves cut to divide it into equal parts in preparation of splitting. The presence of this tusk and some elephant bones in Period I as well as in Period II indicates the start of ivory crafts that played a very important role in the Indus Civilization a few thousand years after.

There is a dramatic increase in the amount of finished objects and manufacturing debris from all types of stone, shell, bone and pottery objects during Periods II and III, from around 5500 to 3300 BC. There is both continuity and change, but the

unmistakable development of copper and possibly
structure, was found covered with layers of animal
gold metallurgy is very important, as is the invention
bones mixed with ashes. The space yielded more of the basic bead-drilling technology that would be
than 100 bone awls and several grooved stones
employed for several millennia to come. Some of
used in shaping their points. It shows some sort of
this is a kind of settling in of technological proc
an industrial area.The use of red ochre continued
esses already well established, such as pyrotech
during this period. The stone implements included
nics and pottery production. It could be said that by
grinding stones and flint tools in abundance. Two Harappan Civilization was already in place atclay
human figurines are important additions to
Mehrgarh and on the plains of the Indus River. So
our knowledge of plastic art in the India of the fifth
too, was long-distance trade.


Fig. 4.4. An elephant tusk from a compartmented building. Period IIA.

An elephant tusk from a compartmented building, Period IIA

millennium B.C. However, the metal remains were
scarce-one copper ring and one copper bead alone have been recorded. Another important type of object that was
Period II at Mehrgarh is, for the most part being produced at Mehrgarh are button seals with
stratified above Period I. These remains form a
geometric designs made of terracotta and bone
broad band of deposits that encircle the deposits
(25). The designs include stepped cross, concentric
of
Period
IB
(25).
There

circle and cross motifs, as well as various combinaare strong signs of continuity between Periods I and II, but change is

present
as
well.
are often repeated in the painted pottery motifs or in
When the excavations at
shapes of stone inlay that have been found in vari
Mehrgarh were still in their infancy it was thought
ous parts of the site. The implications of these re
that Period I was entirely aceramic. But then a

peated patterns is the emergence of a repertoire of few coarse chaff ware sherds showed up in trash graphic symbols that have local meaning and were deposits of what can be called Period IB. The use

used to reinforce social status or possibly ritual ide

ology .of pottery increases in Period IIA and is now found in domestic contexts, not just Lechavallier described therefuse.**Lithic Industry:**
eompartmented buildings are found in Periods IB and IIA .port (44). Out of more than 32,000 microliths colTechnology and crafts are reliable indicators of the level of sedentary living, a general status of the economy, and the complexity of social organization of a settlement. They also help us to gauge the extent of long-distance contacts of the people. Technologies and crafts have been extensively studied at Mehrgarh and their relationship to its chronological periods have been variously commented. The progression is by no

means linear but we do observe a
ivory tusk. lumps of red ochre and grinding stones
general continuity from one period
have been found. Graves have been mentioned but
the
details
seem
to another. In this chapter we atto
be
missing.
Cotton
tempt to review the technology and
(Gossypium sp.)
occurs in this period. Outside the
crafts of Mehrgarh in a general order of chronology.
walls of one of the structures several hundred
Again, our interest is more for Period I through IV
charred seeds were found in a large burned area.
and less for Period V onward.
The discovery of cotton seeds is remarkable sinceSubstantial amounts of craft activities are already in evidence in Period I although their related
this is the earliest evidence of this item in this part of the world.technologies are relatively simple.
The bed of Bolan River carries cobbles of light brown flint from which

Thenumberofpotsherdsincreasesin
the tools were fashioned: some were sickle blades,
Period IIB but only slightly. The increase has been
which occasionally carried sheen. There is a rich attributed by the excavators to the fact that now the
bone industry with many awls, spatulas and a nee
pottery becomes much finer with vessels dle with an eye. It is thought that most of the bone
shaped on a turn table and afterwards expanded
tools were used in basket making and in the prepa
and rounded with a dabber. However, since the
ration of cloth. Some of the burials bore faint traces
increase·
in
pottery
is
of textiles. There is evidence for the manufacture of
extremely limited, it is calcite beads at the site. Baskets for containers
doubtful if pottery as a cultural element played
were in evidence, some of which were lined with
any significant role in the everyday life of the
bitumen to strengthen and waterproof them. Slabs
people. Period lIC, along with the handmade and
of bitumen impressed with basket impressions are
basket marked pottery we have now for the first
also known. A small amount of pottery comes totime the wheel-thrown pottery similar to Kili Gul
ward the end of Period I. Unbaked clay figurines in
Muhammad II style. It is to be noted that now
limited numbers were also found. Other insights into
onwards we have the evidence of pottery being
craftsmanship are ornaments associated with the
produced on a mass scale.burial of a child that show the quality of bead working at this early period. There is very small amount
Wheel-madepotterybeginstoappear of copper but it is thought to be of the native variety,
along with handmade ones in Period IIC. The not smelted.second half of the fifth·millennium BC is a rational
The craft activities continue in Period II with
enough date for Period III, and that takes off with
increasing intensity. In one of the residential rooms tell-tale evidence of increasing craft-specialization
and
were found burnt pebbles, ashes, several hundred perhaps increasing social organizationalanimal bones, about fifteen bone tools, hammer
complexity: fine micro-drills in stone indicating the
stones, polishers colored with red ocher, and a very
use of bow-drills and the ability to engrave on
large collection of blades, cores, and flint debitage.

shell; a few terracotta crucibles with traces of
This seems to indicate some kind of workshop,
copper,
possiblywhichforsuggestleather forworking, firstbaskettimemakinglocal or
the
copper-smelting;weaving. In two compartments of one building stonelarge-scale production of
wheelmade painted pottery showing inter-regional 334 Period II represents growth and continuity styles; and finally, 'an impressive complex of out of Period I and there is justification for them storage units' maintained in five compartmented as a single unit. The presence of rectangular buildings over three building phases. This is also houses subdivided into rooms that are
the
period
when
terracotta
humped
bulls
first
contemporary with compartmented buildings is
important to our knowledge of the South Asian

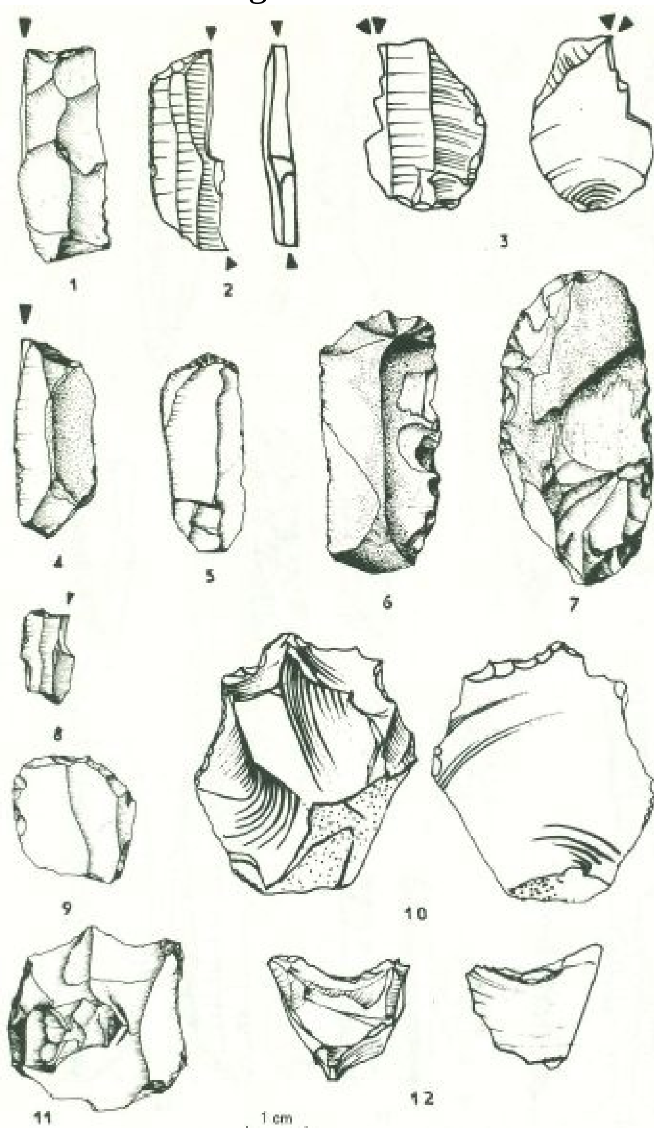


Fig. 7.4. Burins, scrapers and notched flakes. Per. I : 1; Per. II : 2; Per. III : 3, 8, 10, 12; Per. V : 5; Per. VI : 9; Per. VII : 4, 6, 7, 11.

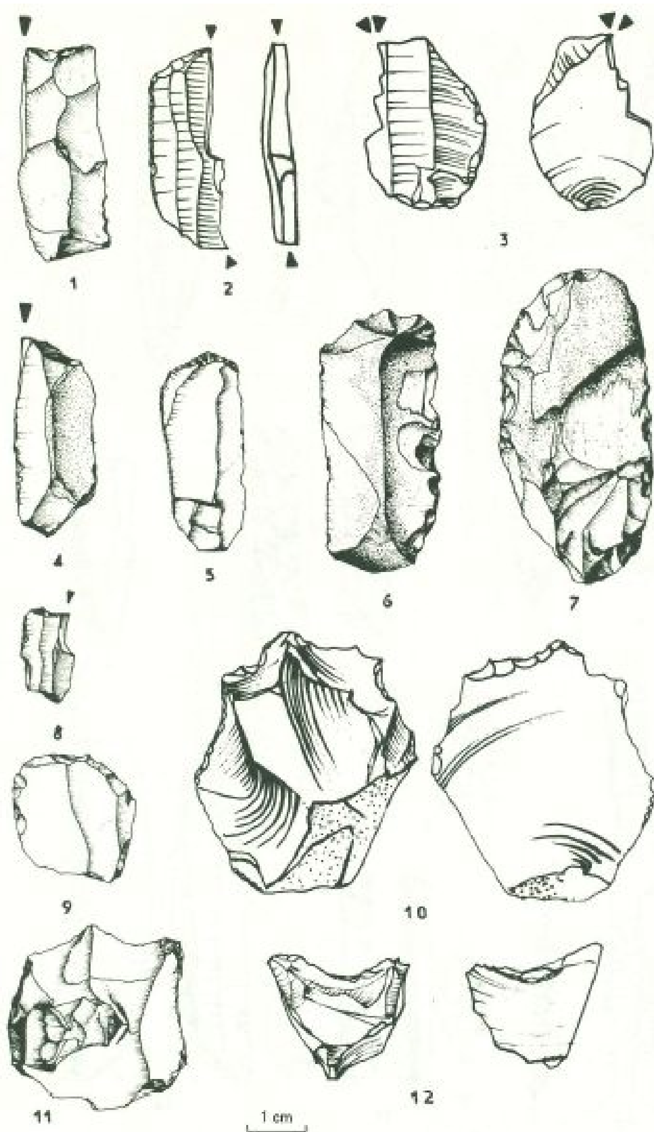


Fig. 7.4. Burins, scrapers and notched flakes. Per. I : 1; Per. II : 2; Per. III : 3, 8, 10, 12; Per. V : 5; Per. VI : 9; Per. VII : 4, 6, 7, 11.

lected, mostly blade-based artifacts, about 20,000 or more belong to Period I, but their number decreases throughout the later periods. Mesolithic tools and blades set in the groove of a sickle as a series of pointed teeth and glued with a thick layer of bitumen seem to be a distinctive feature of the site. A profusion of ground stone food processing tools was found, including a large number of quern and grinding stone fragments, two small limestone chisels, a small stone bowl, and a small mortar.

Previous studies of the chipped stone tools indicated that certain of these artifacts had a micropolish that results from use on animal remains, involving the preparation of hides, butchering, and the working of bone and antler. That these tools were often found in association with red ocher is an interesting observation since ochre may be used for the tanning of hides.

Burins, scrapers and notched flakes - Period I through VII.

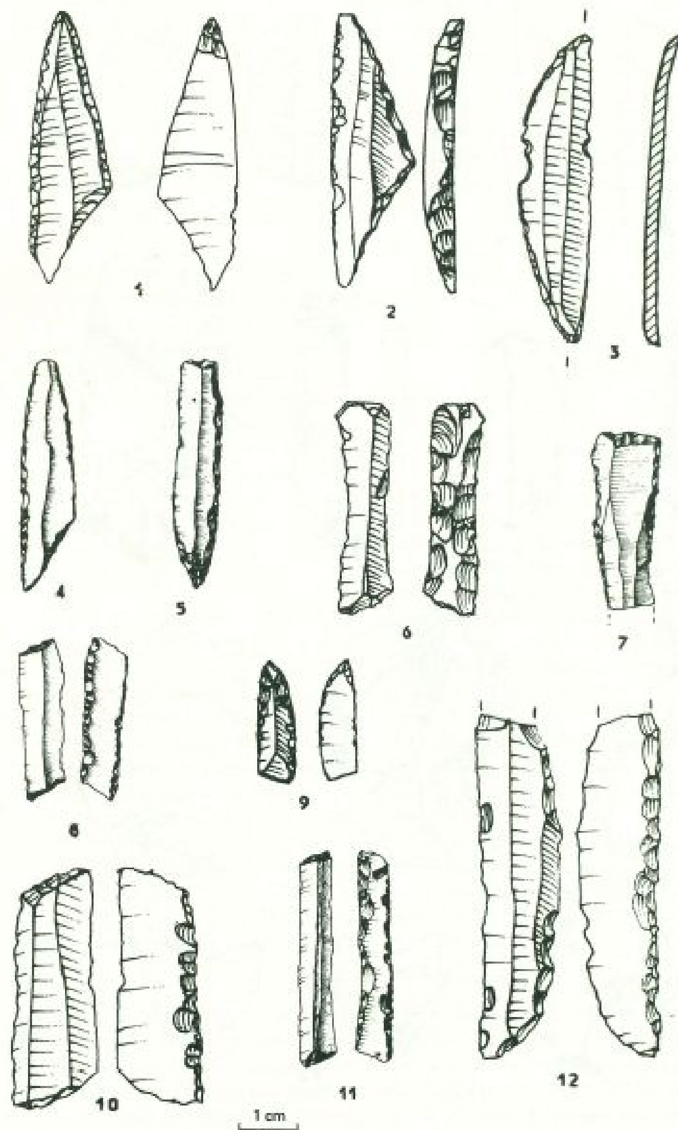


Fig. 7.5. Truncated and backed blades. Per. III : 1–3, 7; Per. VI : 4, 6, 8, 10, 12; Per. VII : 5, 11.

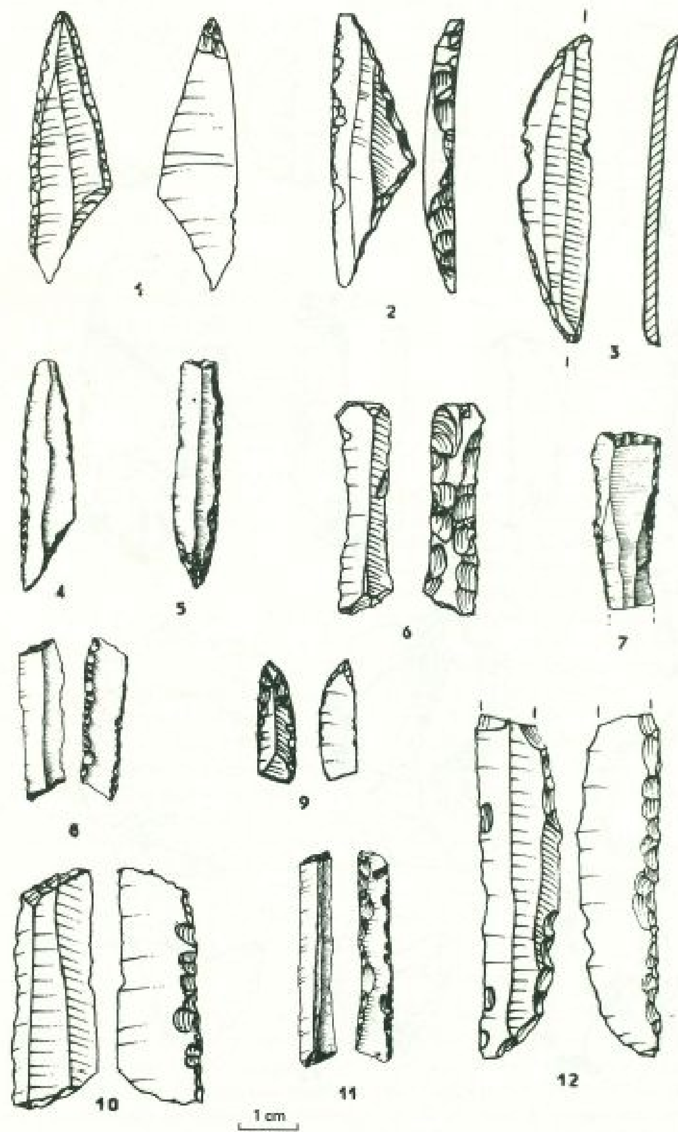
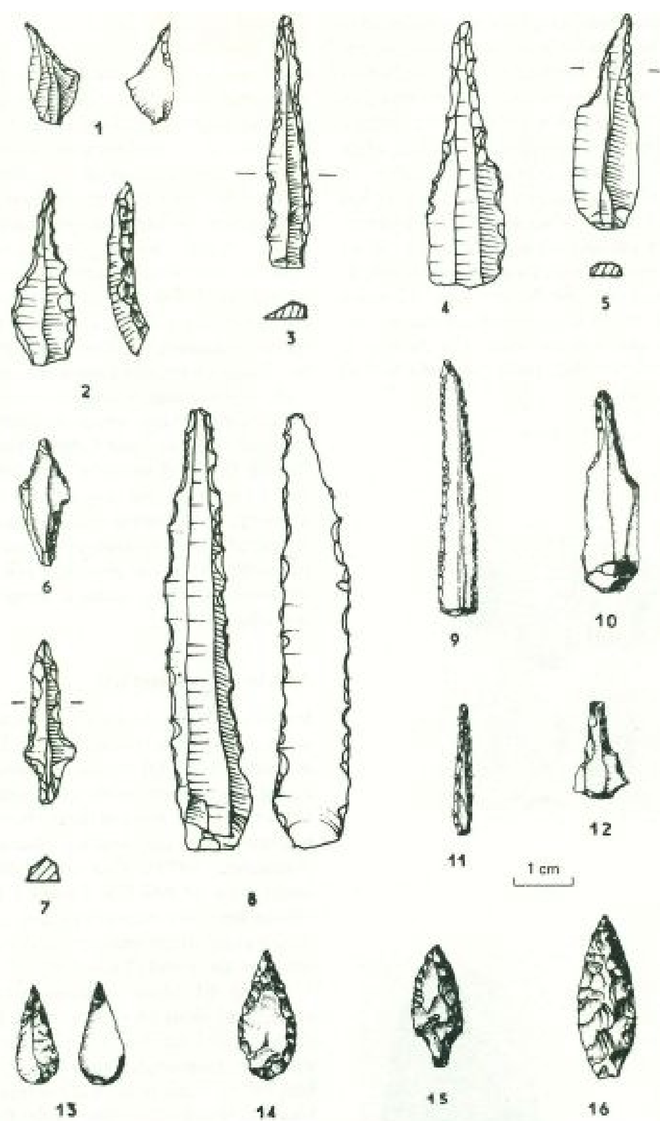


Fig. 7.5. Truncated and backed blades. Per. III : 1–3, 7; Per. VI : 4, 6, 8, 10, 12; Per. VII : 5, 11.

Truncated and backed blades - Period II through VII.



ig. 7.6. Borers and drills. Per. I : 1–4; Per. II : 5, 8; Per. III : 6, 7, 11; Per. VI : 9; Per. VII : 10, 12. Arrowheads. Per. IV : 13; Per. VII : 14–16.

Burins and drill - Period I through Period VII

In another area the remains of a steatite workshop was found, with evidence for cutting the raw material and making beads. Flint drills and flakes were associated with 334 disc-shaped beads with diameters between 3 and 4 mm including several broken during the manufacturing process. Also associated with the steatite beads were a few cut dentalia, a few beads in white talc (some colored with red ocher), and wasters in black steatite. Near

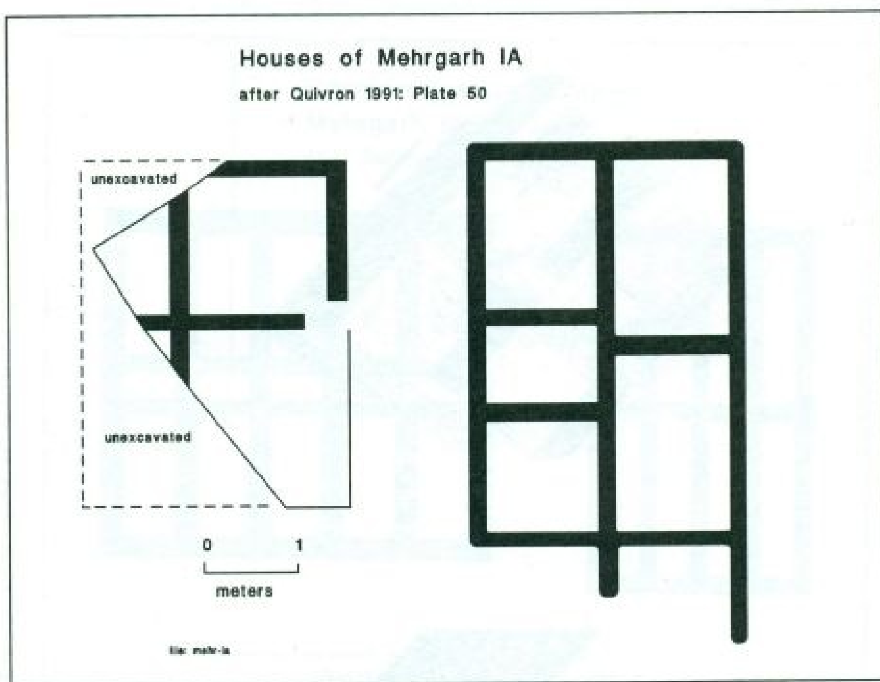
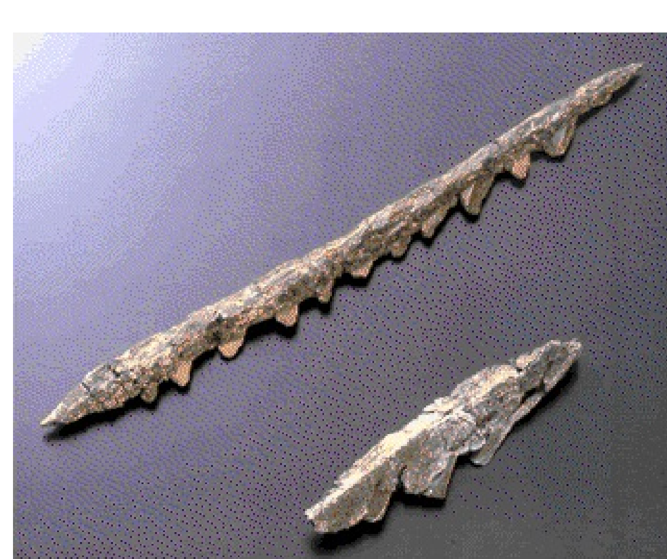


Figure 4.22. Houses of Mehrgarh IA, after Quivron 1991: Plate 50

this workshop, six oblong-shaped cakes of red ocher were found together. East of the building, an open space was covered with heaps of bones among which were about a hundred bone tools including awls and needles. About fifty more bone tools were found close by. This concentration could indicate that we have here an area where bone tools were used in connection with leather working.

Houses in general contain very few flint artifacts. In some cases, however, cores, plain blades and chips show signs of flint knapping, or certain tools, like borers, are the evidence of a specific ac



The early farmers used sickles made of small stone blades (microliths) inserted diagonally into wooden sdticks for harvesting cereals. These composite tools were resusable as ther blades could be replaced with

new ones when the old ones were broken.

tivity. Storeroom floors are usually completely empty. In graves, exceptionally, some artifacts are recorded, which are interesting because of their quality and their unused aspect. Such material has been found in several graves of the upper levels of MR3 at Period I (axes, cores, microliths) and in a

grave of Period VIII (lunates).

The material utilized is flint. Large flint pebbles are found nowadays in the bed of the Bolan River, which must have been the case also in the past. Many cores still carry well-polished rounded patches, characteristic of water-worn rock. The flint is of good quality, grey to brown in color. For some pieces other hard stones have been used, especially for the axes of Period I (mainly chlorite), the drills of Period III (phtanite) and some arrowheads in the last periods (jasper, schist).

The debitage is characteristic of a blade industry. From the core sizes one can see that at the beginning the trend is to produce thinner and smaller baldes than later on. This is also noticeable in the decreasing proportion of bladelets to blades (that is, blades under 10 mm wide). In the last periods, the blades are characteristic of the debitage of the Harappan period. As consequence, most tools are made on blades. Flake tools are few, and most of them have been found in Periods I and III. Core tools are exceptional, as seen from the number of axes and adzes.

Microliths: With microliths - and especially the geometric microliths - the function is usually believed to involve hunting and fighting, as their most common use has been shown to be for transverse arrowheads or barbs set serially in the heads of spears. But at Mehrgarh, from the beginning, another function, harvesting, must be added since part of the microliths show the characteristic gloss deposited on the working edge by the silica of the grasses cut (44). We can also rely on the presence of a typical transverse arrowhead set in bitumen in Period II. Considering this double function, it is perhaps significant to see an indication of the relative importance of hunting and harvesting through time in the varying proportions of geometric microliths with and without silica gloss. Of course one must also allow for the fact that unused geometric microliths may have been new elements, ready to be set into the shaft of the sickle itself. So it seems that, considering the disappearance of microliths at Period III and their presence from Period IV to VII as probably due to their special use as sickle elements, they were no longer intended to be parts of weapons. However, no doubt hunting activities never disappeared and, if after Period II there are no more transverse arrowheads, true arrowheads are present from Period IV on, first as short points retouched at the tips, then as elaborate points with covering retouch.

Harvesting tools are not limited to microliths since at Mehrgarh blade segments were also used as sickle elements at all periods. They are usually not truncated and not backed. They were, like the microiths, obliquely set into the groove of the sickle as a series of pointed teeth and glued with a thick layer of bitumen. As shown by Lechavellier (44), the proportion of blades to microliths used as sickle elements varies through time. A possible explanation for the relative increase of microliths used as sickle elements after Period III is that backed elements such as lunates and triangles are more resistant to fracture than thin segments of bladelets. Their shape is also more regular and this goes with the perhaps more professional and specialized approach to flint knapping in the later periods. The fact that flint persisted as the raw material for sickle elements suggests that it was less expensive than metal. This situation can be observed at Pirak in the Iron Age, where a large quantity of strong, wellmade and stereotyped sickle elements have been collected. Bronze, still a rare product, was reserved for weapons, ornaments, and objects of prestige, while flint, obtained locally and quickly processed by trained peasants or craftsmen, was used for harvesting, among other functions.

Scrapers and burins: Burins are exceptional until Period III . End-scrapers are not abundant and not very typical at the beginning. It is worth noting that these two types, usually associated with bone

working, are precisely absent in the first two periods where there are many more bone tools than in the following periods. Along with scrapers and burins we could consider all the tools whose function is cutting, sawing and scraping. But it is impossible to specify the patterns of use of the variously retouched blades, especially as microwear analysis has not been carried out. However, the obliquely truncated blades and large triangles which are specific to Period III are worth a special mention. They might have worked as points and been used for hunting.

Borers and pointed tools: Borers are a characteristic tool of the first three periods. Their presence is usually connected with bead making, and in Periods I and II this activity is well testified. A workshop of calcite beads has been found at MR3 (phase Ib) and another of steatite beads at MR4 (phase lIb) along with small borers and plain bladelets, probably ready to be retouched into borers and drills.The number of flint borers falls to almost zero in Periods IV to VI, and to a few pieces in Period VII, as if piercing had then been achieved with other hard stones, easier to round off than flint. An example of this is perhaps the phtanite drills found in large numbers in Period III associated with various fragments of raw material for bead making (carnelian, lapis lazuli). Other explanations might be due to growing specialization: (a) the people of Mehrgarh



were no longer making beads and relied on imported

Fig. 14 :material from, for Period I: flint microliths set in bitumen. © C.
example, Afghanistan,
Jarrige where all sorts of stones could be obtained locally; (b) the areas of Mehrgarh where bead workshops
picked surface and it is only in a later stage (level 7)
tions to date. This was more probably the case as a
that the axes are polished, the finer examples coming
few unfinished beads have been found in these lev
from the graves of Cemeteries 8 and 9 (Fig. 15).


Fig. 15 : Period I: Polished stone axes. © C. Jarrige

Polished stone axes, Period I

The remains of several workshops of beadmakers
els, and most of the areas excavated seem devoted mostly to pottery making and storage.
with beads in calcite or steatite in various stages of
Heavy-duty tools: When dealing with seden

processing have been found in different levels (Fig.
tary groups of people, as at Mehrgarh from Period IB onward (in phase IA we have so far no evidence
16). The gravegoods have also provided us with a
of brick houses), one has to wonder what tools were

rich corpus of information about the craft activities in the course of the aceramic Neolithic period of[337] Mehrgarh. They include a wide range of ornaments made predominantly of seashells, but also of lapis

lazuli, turquoise, black steatite and several other

used to cut the timber needed for making the roofs of the mud-brick houses and for the tilling implements required for agricultural activities. These tools have been found, but only in Period I, exceptionally in Periods II and III, and none after. In phase IB there are some rough axes, some well-polished axes and a few rough adzes. In phase IC, a number of pieces were collected on the surface and most of the others were found in graves, near the head of the burial, either alone or associated with a core, microliths, or a ochre lump. These artifacts are the most perfect specimens found. The axes are long, thick, rounded in section, with slightly convergent sides and cutting edges. Those found in the graves are completely polished, while the others may have only the cutting edge polished. In Period II only one small, long, narrow unpolished axe has been found; in Period III, only two pieces, of a different type: small, flat, with parallel sides. After Period III no large flint



tools are found. This seems quite reasonable, as

Fig. 16 :
Period I: remains of a steatite beads workshop
Periods IV-VII fit well into the Bronze Age. If bronze
showing stages of manufacture. © C. Jarrigetools existed, they might not have been preserved
as flint tools were, being too precious and rare to be
discarded. When broken or worn out they werean early context and also the use of resources from probably melted down and the metal reused.
often far away regions.
Conclusion: If we consider the main features of the flint industry of Mehrgarh through different

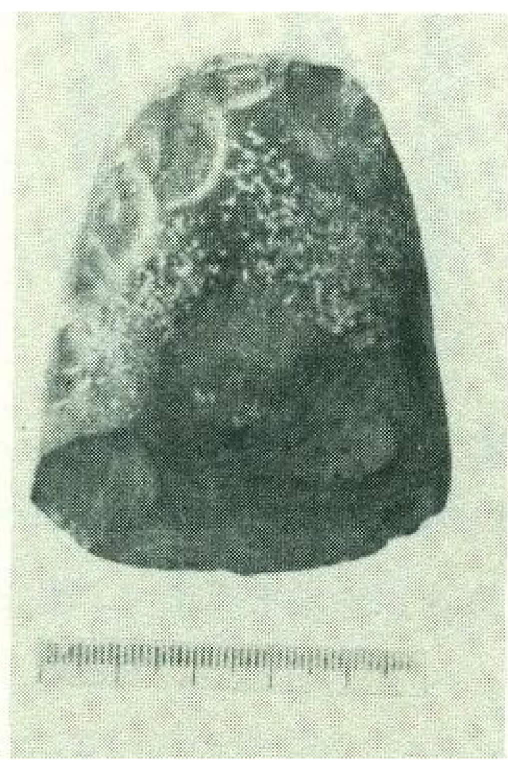
The graveyardsperiods, we can make out the existence of three

different units, despite a continuity in the flint
knapping technique and the persistence of a large

Alternating with the nine building levels, nine levels
number of types through time:
of graveyards have been recorded. A total of 318
Periods I and II form the first unit; there is a
great homogeneity in the blade production. The asgraves have been exposed, among which, from level
semblage is on the whole 'neolithic', with certain Epipaleolithic
characteristics
like
the
1 to level 9, 179 have yielded gravegoods. At the
varied, un
standardized geometric microliths. There is apparbottom of an about 1 m deep pit, a small space dug
ently also some variability in the functions of the
on one side of the pit was used as a small burial artifacts, reflecting a partially specialized society.
Period III has its own characteristics: the disapchamber. Then the burial chamber was, after disposal
pearance of microliths and the exclusive use of new
of the dead body always in flexed position, blocked
types (large trianglees and obliquely truncated
by packs of hard clay or by brick walls, and the pit
blades), and a large number of retouched flakes such as scrapers, notches and denticulates . Peri
was filled with earth. More than 75% of the graves
ods IV to VII form the third unit. A general feature is
have an East-West orientation. The heads are in
the decrease in the importance of the chipped-stone
industry; the common characteristics are the apparmany cases looking toward South, but also towards
ently restricted use of certain types to specific activiEast and more seldom towards North. Other graves
ties, such as microliths as sickle elements and the
presenceare mostly oriented North- South.arrowheads.These traits correspond to a much more specialized society.

The most characteristic graves from the lower levels are single pits or tombs with a funerary chamber in which the dead was placed along with offerings of young goats disposed in a semi-circle around the

legs (Fig. 17). The existence of funerary chambers


An axe from Period I

Pottery: Ceramics are the most ubiquitous evidence for craft production at Mehrgarh. Evidence of pottery begins from Period II. In period III, the finds becomes much more abundant as the potter's wheel is introduced, and they show more intricate designs and also animal motifs. The characteristic female figurines appear from Period IV and the finds show more intricate designs and sophistication. Pipal leaf designs are used in decoration from Period VI onward. Some sophisticated firing techniques were used from Period VI and VII and an area reserved for the pottery industry has been found at mound MRI. However, by Period VIII, the quality and intricacy of designs seems to have suffered due to mass production, and due to a growing interest in bronze and copper vessels.

Baskets for containers were in evidence in Period I, some of which were lined with bitumen to strengthen and waterproof them. Slabs of bitumen impressed with basket impressions are also known. Some of these baskets had been used in the preparation of the earliest ceramics at Mehrgarh. This ceramic was also found at Kili Ghul Mohammad also and illustrates a fascinating way to make a pot. The potter took a basket, probably an older, used one and packed clay around the inside. It was then fired, the basket itself providing some of the fuel in a process of self-destructive creativity. The finished pot carries the impression of the basket on the outside surface and can be used in the study of ancient weaving. Jarrige and his team found that the outside of these pots was sometimes covered with a thick coat of mud, to hide these impressions and smooth the surface. Kili Ghul Mohammad has no evidence of this practice.
The link between early pottery and basketry is an interesting example of experimentation in a time of the development of both craft technologies and Gokurt, in the Bolan Pass not far from Mehrgarh. In the course of Period IIA, however, some sherds were made of better fabrics and represent a process of technical improvement.

Anothertypeofpotteryat Mehrgarh occurs in Period II. It is a soft, shafftempered ware, handmade with simple shapes. The pots were assembled from slabs and daubs of clay, which were added one above the other to form a circular container. The internal structure of the vessels can be seen from lines of cleavage between the "slabs" as shown in the above figure.Some vessels have a red slip or daubs of red paint.Two ex





A Mehrgarh container ca. 3000 BC
Painted sherds from Mehrgarh Period IV

farming techniques. Further diversity in the early history of Mehrgarh ceramics is available from a pot sherd found in a compartmented building. It had a kind of framework of reeds coated inside and out with mud and then lightly baked. Asphalt or bitumen probably came from the tar pits that are near ceptional sherds have an applique design of a stylized caprid. This kind of soft ware has not been found anywhere else in Baluchistan but has a wide distribution across the Iranian plateau into the Zagros Mountains. In these contexts it comes in the middle of the sixth millennium BC (5500 BC). Containers made of plaster, a feature of early village farming communities in the Middle East, are not known from Mehrgarh or anywhere else in Pakistan.

The potter's wheel probably appeared

at the late stage of Period II; it certainly expanded in Period III. A series of kilns associated with Period III ceramics was

found, indicating that pottery used at the site was manufactured there. The kilns, of which only bases are preserved, are circular or oval in shape, with an average circumference of 8 feet (2.5 m), and built of mud bricks. Testing in the kiln area showed that the

The basket burnt away and the finished pot carried the impression of the basket on the outside surface. Jarrige and his team found that the outside of these pots was A Prelude to Civilization mud after firing, to hide these smooth the
nce of this
probably

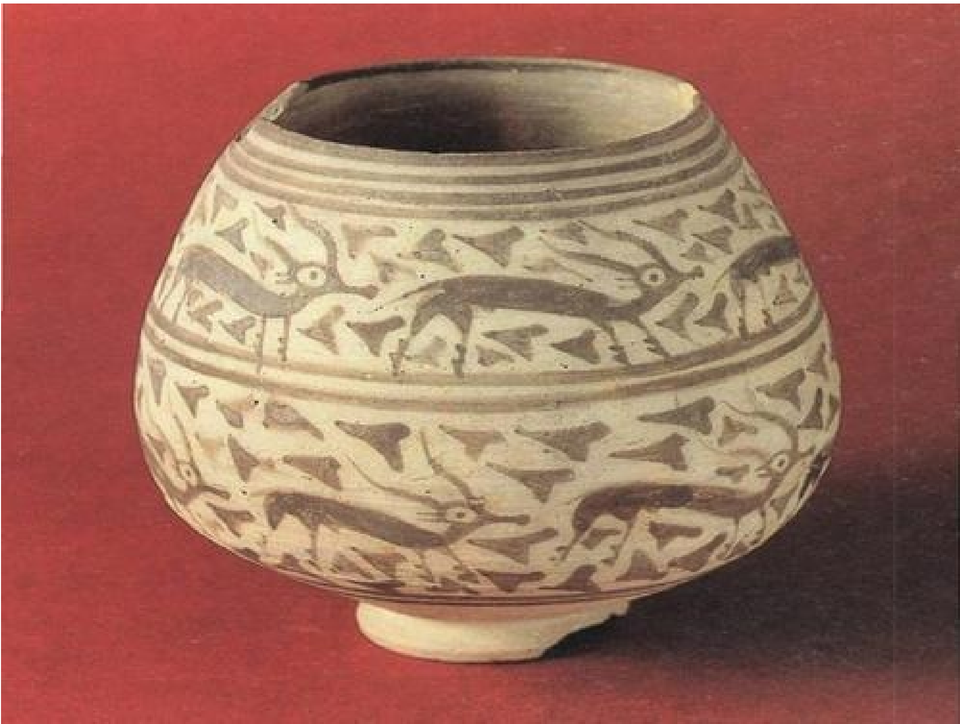


A modern woman making pottery the Mehrgarh Ib way, layer after layer, applying slip on the inside as well as on the outside to smooth the surface. The similarities in technique are evident.

A modern woman making pottery the Mehrgarh IB way, layer by layer, applying slip on the inside as well as on the Pamela **outside to smooth the surface. The similarities in tech**studied **nique are evident**

deposit there is 19 feet (6 m) deep, with loosely Page 187stratified ash, kiln debris, and wasters.

The pottery of Period III is predominantly wheel-thrown; 30 % of the sherds are in a coarse buff ware, the remaining sherds are fine, in light buff ware, with 40% of the examples a red slip. 10% of the potsherds are painted in black on red background or on the buff surface. Rows of processing caprids or birds exist among registers of geometrical motifs. Flying birds are quite often associated with painted motifs. Geometrical designs include dot-tipped motifs, rosettes, hatched or plain trian


An exquisite vase from Mehrgarh ca. 3000 BC

gles or butterfly patterns and chequerboard patterns. Besides these new motifs, bowls with rims decorated with suspended vertical lines or with suspended festoons are identical in their forms, fabrics and paintings to the pottery of Period II. The pottery of this period is similar to the pottery of Kili Gul Mohammad Ill. The animal designs could be related to Togau A, Hissar J.B.I.C, Sialk III and Namazga II. They must have been existing in one horizon. The period also records the first appearance of ‘Wet Ware’ which is a hallmark of Period IV..

Jarrige reports (25) the very large area of distribution of the pottery characteristic of Period III, this being about 75 hectares. Although such a wide distribution could result from several shifts of the settlement, one nevertheless can assume that this period corresponds to a high density of population. Despite its homogeneity, stylistic variations in the pottery and accumulation of 3 or 4 meters of deposits in some areas indicate that this period must have lasted for quite some time. The only radiocarbon date gives a result of 4745 ± 80 BC (uncalibrated), which is earlier than previously estimated; but since stylistically the pottery of the upper levels of this period corresponds to the pottery of the earliest phase of Mundigak, arrownd 4000 BC, a date in the second half of the fifth millennium is not unlikely for the early phases of Period III.

The most spectacular change in Period III is the massproduction of pottery. After an early stage (Period IIC), where wheelthrown pottery starts to occur alongside hand-made and basket-marked pottery similar to the KGM II style, we have an impressive development of the ceramic industry. Heaps of sherds (40 per cent in a fine fabric with geometric or animal motifs) have been exposed mixed with ashes. Such large-scale production, the intensive use of the wheel, the quality of the paintings, mostly geometric in early phases and later on with rows of caprids and birds in the Togau A and KGM III style, represents an obvious stage in craft specialisation in the Greater Indus area.

The ceramics of Period IV is characterized by plain standardized pots, tulip shaped goblets, 'brandy' glasses, piles of plates of different sizes, sturdy storage jars with collared rims and tapering lower parts on flat bases. About ten per cent of the pottery in Wet Ware forms are often very elegant. It is observed that the rows of stamped circles become a common decoration during this period.

Technically, the potters of Period III at Mehrgarh were producing a pottery of superior fabric when compared to the pottery of Sialk II and of the early phases of Sialk III or Namazga I and II, which were hand-made. Pottery with inter-regional affinities continued to be made, some in polychrome style. Some changes in pottery styles and designs



A clay vase from Mehrgarh, about 3,300 BC.

are noticed in Period V, but by and large things do become more numerous. Many of the female figunot change, until Period VI. Interestingly, in the first rines are holding babies, and were interpreted as half of Period VI, almost 50 per cent of the painted*izkX/kkjk] vad & 18*depictions of "mother goddess".
pottery is a red ware decorated with *pipal* leaves. Well-fired grey ware makes its appearance, and there is evidence of inter-regional pottery styles. A large kiln provides evidence of ceramic production for market.

The pottery firing was undertaken in updraft kilns as well as in large pit kilns for the production of large quantities of storage jars. At this point there is

no indication of the types of kilns used for faience production at Mehrgarh/Nausharo or at Harappa. The presence of copper melting crucibles at Mehrgarh (46) indicates that this technology was being practiced at sites far from the original source of the raw materials (47).

A new technological development seen dur ing this period at Mehrgarh and Nausharo is the

Theoldesthumanrepresentationat Mehrgarh is made of mother-of-pearl and is in a standing attitude. (see the figure). Most of the figurines are molded in unbaked clay, some are seated and some are stand
ing. During Period IIA no standing type has been found but sitting type is present in con tinuity with those of Period I. Majrity of them are small with

linked with religious rituals and sympathetic magic. The symbolic of the snake may indicate a desire to control the hidden forces of nature; as for the holes pierced through the clay, they either represent an attempt of a magical treatment of a pain, be it moral



or physical - or of a way to harm someone through applied ornaments. In Period IIB changes an image. seem to occ.r. Physi cal features are

production of blue-green glazed faience beads. The izkX/kkjk] vad & 18 shaped: a pinched

Fig. 13 : Perforated clay figurines from period Iface, outlined partition **Perforated clay figurines**

III. The Mehrgarh sequence: contacts and

production of such ornaments required fairly high firing temperatures as well as a specialized tech

nology of frit and glaze preparation (50).

Figurines: In addition to many new styles
and shapes of pottery, one of the most important

heritage

additional interest to its location and to the role
Fig. 5: Clay standing figurines from period I

which the woman who was holding it in her hands Period III, along with beautifully shaped terracotta bull figurines, has yielded only one shapeless, but in

forms of symbolic objects are terra-cotta figurines.
creeping up the body. There is also one instance of
was playing in the society.
The Neolithic human figurines from Mehrgarh area figurine with applied straight hair adorned with
reproduce the shapes of both groups, the standing terracotta, human figurine, probably standing. But a
contemporary site, Sheri Khan Tarakai near Bannu
and sitting examples. They all belong to levels 7 and
so far the most ancient assemblage known in thesmall circular pellets as well as a belt.I have not found so far many other examples in the8 (Fig.8). in Pakistan, has a number of figurines which couldwhole of South Asia. They occur in all phases of the archaeological literature, except for a much later fit within the stage of the evolution at Mehrgarh.settlement and were prevalent even before pottery Medium sized sitting figurines also show appliednd millennium at Togolok in During period IIA, no standing figurine has been appears. They account for about 100 items, spread period (early 2 With period IV onwards, the distinction between theTurkmenistan) where figurines found in a pot, werefound, but the sitting type is present in continuityover the MG I (81), MGIIA (17) and MG IIB (4).belts or necklaces. But most of the large ones are
They are far more numerous than the animal figu bare, without any application (Fig.7). 5 rines which represent mostly bulls.The corpus of the
stabbed with small flints. Along with those clay figurines are pebbles selected with period I. A very small one has been finely
male and the female representation is going to be
shaped (Fig.9 left), highlighting the curve and thethe rule (Fig.14). Sitting figurines show distinct
human figurines has considerably increased with
the 1997-2000 program of excavations.
Pr¢gdh¢r¢, No. 18
for their shapes and almost unaltered, but which
Whatever elements we have give no evidence of a
width of the hips. But the majority of them are small
features, which will be constant all along the evolution

Theearliestfigu
rines are quite simple
and do not show intri
cate features. How
ever, they grow in so
phistication with time,

Clay standing figurines from Period I

cult of any kind, but suggest a temporary function from period IV (


Fig. 5: Clay standing figurines from period I


Fig. 4 : Mother-of pearl figurine from period I, level 1.

Mother-of-Pearl figurine from Period I

and by 4000 B.C., becreeping up the body. There is also one instance of gin to show the chara figurine with applied straight hair adorned with acteristic hairstyles small circular pellets as well as a belt. and prominent
breasts. It is interestMedium sized sitting figurines also show applied ing to note that combelts or necklaces. But most of the large ones are pared to the figurines bare, without any application (Fig.7). reproduce the shapes of both groups, the standing and sitting examples. They all belong to levels 7 and 8 (Fig.8).

During period IIA, no standing figurine has been found, but the sitting type is present in continuity

with period I. A very small one has been finelyone in limestone, found in two graves of the laterof the Neolithic period, **Small sitting figurines from Period I**



cemetery 1 (dug in level 1) in the same sector of later Chalcolithic Along with those clay figurines are pebbles selected shaped (Fig.9 left), highlighting the curve and thetrench MR3 S. the

figurines have many ornaments and decorative fea

for their shapes and almost unaltered, but which width of the hips.
tures. The decorative techniques include appliqué,
Most of them, however, are modelled in unbaked

clay. They can be divided into two groups: the modeling, and incising as well as painting with red,
standing (or straight) figurines and the sitting (orblack or yellow pigments (46). The diversity of hair
flexed) figurines.styles and ornaments on the figurines undoubtedly

reflects the changing patterns of personal ornamen

Straight clay figurines account for 16 items, 9 with
tation by the peoples living at the site of Mehrgarh
a rounded base and 7 with a flat base, almost all
and may indicate increasing status differentiation
in period I. They are often ochred and have been

and ethnic diversity.

found in levels 1 through 8 (Fig.5). All the figurines up to this period were female. Male
The first sitting (or flexed) figurines appear in levelfigurines appear only from period VII and gradually
3. They account for 78 items, among which 60 in 340

Fig. 6: Small sitting clay figurines from period I But the majority of them are small between the legs or a belt made of large applied pellets on sitting figurines, limb - arms and lergs - begin to appear.

Few figurines have been found in what could be primary contexts. Most of them have been discarded and even found in trash or secondary fillings of the ruins. Even if they appear to belong to a floor level, they are associated with other artifacts without any obvious or even meaningful signifi

cance. Figurines in the ancient Near East oftenhad
Fig. 14 : Stylistic evolution of the Mehrgarh figurines from period I to period VII. Top (from left to right): Periods I, II, IV, V, VI, VI, VIIA; Bottom: Period VIIB period I, 16 in period IIA and 2 in period IIB.
Among them, a distinction has been made between
small (27) and medium or big (44).



A Prelude to Civilization

magical rather than divine purpose. This leads us to the question of the function of the figurines and of their ideological status.

During the cleaning process of a standing figurine with a rounded base, a few holes appeared on the surface. The holes were running through the



Terracotta figurine from Mehrgarh Period IV, ca. 3500-4000 BC



The Bird shaped Figurines from Mehrgarh

figurine and had been made by thin vegetals which had left their imprint in the clay. Several other figures of this nature were later discovered and it appeared that this practice was widespread in the very early Neolithic (Period I). Was this the beginning of the Woodoo type magic, the witchcraft, or black magic, generally? No such examples have been found in the later periods of Mehrgarh or at any

other place in the region. Jarrige mentions on the authority of Sariandini (27) some examples in much later period (early 2nd millennium at Togolok in Turkmenia) which were figurines found in a pot; they were stabbed with small flints.

Period II, along with beautifully shaped terracotta bull figurines, has yielded only one shapeless human figurine. A contemporary site, Sheri Khan Tarakai near Bannu has a number of figurines which could fit within the stage of the evolution at Mehrgarh. With Period IV onwards, the distinction between the male and the female representation is the rule. Sitting figurines show distinct features which will be constant all along the evolution from Period IV (ca. 4000 BC) to Period VII (ca. 2700 BC): males are standing while the female attitude is a development of the sitting type (28).

The Neolithic figurines of Mehrgarh represent the early stage of a tradition of human figurines which throughout the Chalcolithic periods of the Kachi area were produced by the thousands. Keeping in view the revised dating of the early Neolithic of Mehrgarh, probably 8th millennium, Jarring recommends that the early figurines have to be studied within the general context of the process of neolithisation throughout a vast geographical area extending from western Asia to the banks of the Indus. The association of human figurines, usually assumed to be female, with bulls is often considered as emblematical of the process of neolithisation. According to Jaques Cauvin (29), the association of female and bull figurines represents the set



A female figurine, arms bent at the elbows and body molded in partial sitting posrures. The applied hair is styled with a

central parting and has vivid remains of colored pigment. The eyes are indicated by deep punctured holes. From late

period of Mehrgarh, probably from ca, 2800 to 2000 BC, from a private collection

ting of an ideological system which has been instrumental in the process of emergence of farming economy. In the case of Mehrgarh, we can see that the animal figurines are limited to a small number of fragments and only a few can be identified as bulls. This is worth pointing out since the domestication of *bos indicus* is the main feature of the process of neolithisation at Mehgarh, becoming the predominant element of the pastoral activity by the end of Period I (26).



A figurine from Mehrgarh, *ca.* 3000 BC. (Musée Guimet, Paris).



A 6 inches long bull shaped rattle from Mehrgarh Period IV-VI, ca. 3500-2800 BC.

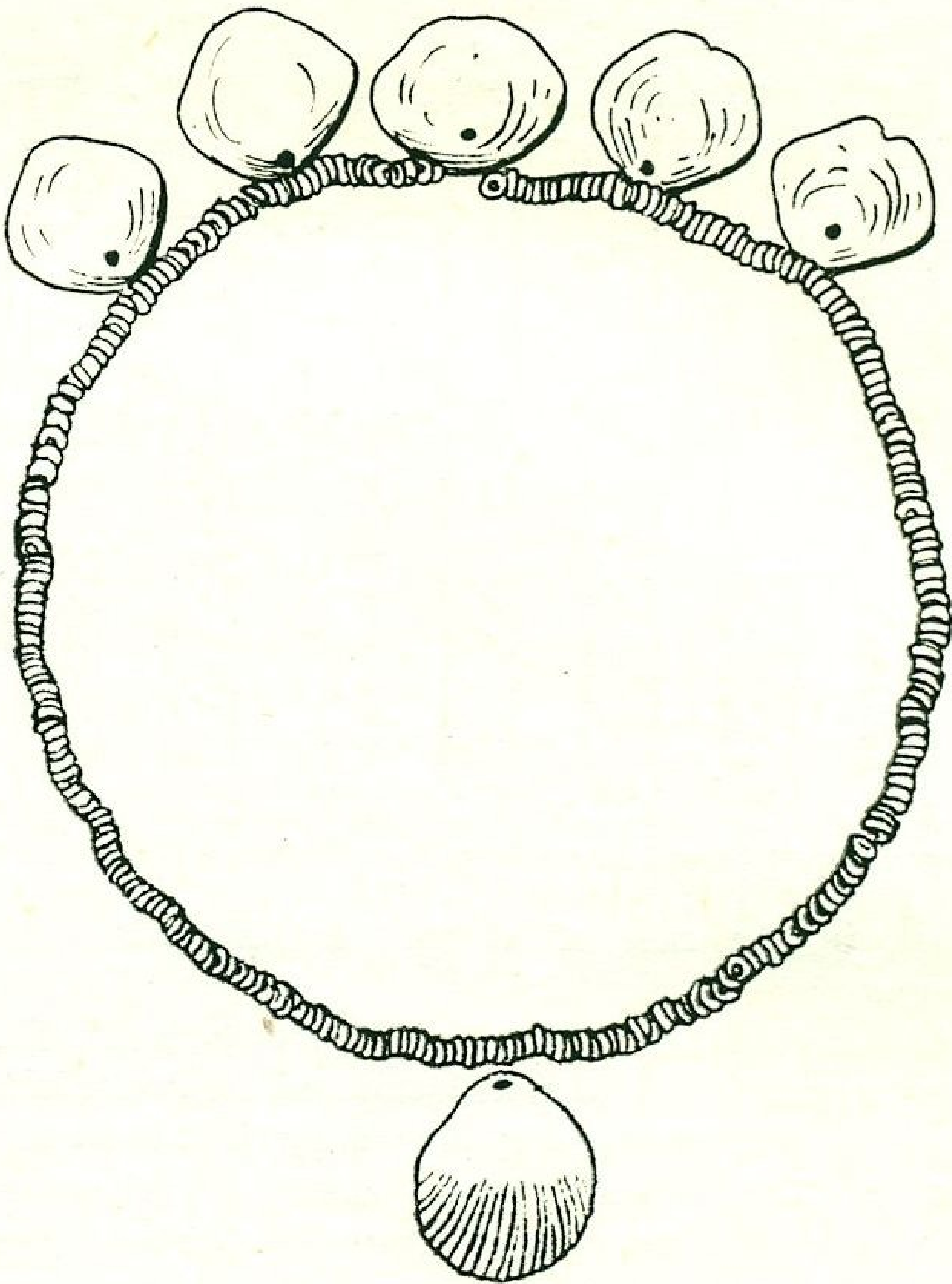
By Mehrgarh, period VIIB and Naushahro Period IB, female figurines display large breasts, hairdoes and ornaments, as well as bent arms and legs that have been in sequence associated with women representation. Male figurines, on the other hand, have flat chests with small nipples, a phalic pendant as well as straight arms and legs. This is still the case during Period IC at Nausharo but disappears in Period ID with a kind of loss of memoray of the meaning of these characteristics, which leads to females with with straight arms and, legs, and males carrying infants or adorned with numerous ornaments.

Links can also be established between Mehrgarh VIIB and some Indus type figurines and between Nosharo ID and Nosharo III, complimentary with comparable figurines from Harappa. Through Th.ese examples, one can seed Mehrgarh Period I until its end ca. 2500 BC and even in some instances during the Indus Civilization, the early figurines of Mehrgarh are an essential component in the vast geographical zone which extends from central Asia to the Zagros, whose ramification will reach even further during the second millennium BC (see Chapter). If these figurines represent some sorts of symbols, then these symbols circulate through the same exchange network as raw materials, technology, funerary practices, agricultural crisp, domesticated animals, and reveal the links, the contacts and the exchanges by the Zagreb flanks, Baluchistan and the Indus, the Kara uKm desert and the Makran coast.

Ornaments: Throughout its existence, Mehrgarh is noteworthy for its lapidary arts and crafts, beginning with its earliest stages. Thin discshaped beads in black steatite, long barrel-shaped beads in

calcite, and well polished bangles of conch shell reveal the existence of craft traditions that lasted for a long time in the region, as exemplified with the presence of calcite beads, pendants, etc at the site. The presence of burins and microdrills in Period II indicates lapidary activities.

Most of our evidence for ornaments comes from burials in the Period I through III, the number of burial goods interred with the dead decreases over time such that the later burials have very few ornaments or utensils (51).The types of ornaments found in the early burials include steatite bead necklaces and bracelets, along with pendants of lapis lazuli, carnelian and other semiprecious stones. The varieties of sotne beads increase in later times, with new shapes and many



Mehrgarh I, seashell belt

Fig.18 : Headband and waist ornament in Grave 274 (cemetery 5). © C. Jarrige
In Burial 281 the headband is even more spectacular. 23 long cylindrical shell beads and of a lozenge
A Prelude to Civilization

The numerous dentalium segments have been woven shaped mother-of-pearl pendant. Another most different varieties of rock being used to produce
attractive ornaments. Female burials have almost

phanite, wasters, and fragments of lapis lazuli, carspectacular discovery in this grave was a rather nelian, and steatite were found together with orna

twice as many ornaments as male burials, while
A belt-like ornament was also uncovered around
large rounded lapis lazuli bead found near the chin
ments in shell, two fragments of rattle-like objects,
of the decease.

juveniles have even less than the adult males. This the waist of a male in Tomb 279. It consisted ofand a few bone awls. The phanite drills are of a type found at Shahr-i Sokhta, Mundigak and GhaziA very young child was also uncovered adorned Shah, a clear indication that these sites shared awith necklaces made up of dentalium shell and common bead-drilling technology that linked distant

steatite beads as well as anklets in polyhedral shell
places. Unfinished phanite drills were found in the
beads. Two heaps of red ochre were placed on
debris associated with the flaking of semiprecious stone.
each side of the skull in Tomb 578. The large size
of the ornaments indicates that originally they

pattern is quite the opposite of what was noted for the earlier Neolithic period burials. It is interesting to note that there are no shell bangles found in the later burials and over time, the numbers of shell bangles found at the site do not show a marked increase as is the case at Harappa.

The technologies used to create ornaments were not very complex during the early periods and involved relatively simple procedures of chipping, grinding and drilling (48). Since no evidence of manufacture of exotic materials has been found from Mehrgarh during this early period, it can be assumed that ornaments from non-local materials were produced by craftsmen/women in distant resource areas and traded to the settlement in finished form (25,49). It is not unlikely that communities in the western Baluchistan highlands may have been active in the manufacture or trading items such as lapis and turquoise beads, marine shell
beads and native copper beads, all of which have



been found in early burials at Mehrgarh. In addition
to this highland trade of exotic commodities there is

Grave 281 (cemetery 4) and detail of headband. © C. Jarrige
Period I. A headband from cemetery 4 (C.Jarrige**)** a possibility that some items, such as large shell

bangles made from the marine shell Turbinella pyrum were traded up the Indus valley and reached the site from this other direction.

The production in the periods following the Neolithic (after 5500 BC.) shows an increase in the importation and processing of non-local raw materials. During the Ceramic Neolithic and later Chalcolithic periods at Mehrgarh (Period III, around 4800 to 3300 BC.) there is evidence for local production of soft stone beads such as steatite and limestone (48,52). Copper or stone drills were probably used on the softer materials. During this time we also see the earliest use of harder varieties of rock such as agate and jasper that were being perforated using specialized stone drills. Local manufacture of marine shell ornaments is also well established (25). Both bead making and shell working involve nonlocal materials, several stages of production and more complex technological processes that may indicate the presence of m[re than one craft specialist.

Lapidary shows marked development in Period III. Lapis lazuli, turquoise, and carnelian were worked into beads with green cylindrical jasper drills. The jasper bits of this period are the earliest specimen known of a type that was used during the third millennium B.C at Shahr-i-Sokhta, Shahdad and at Chanhu-daro. These are some very fine micro-drills indicating the use of low-drills working and engraving ornaments in shell. Evidence for manufacturing processes involving lapis lazuli, carnelian, calcite, garnet, turquoise, shell, and bitumen was found in MG2, belonging to Period III. Fragments of these were clearly waste products of workshops in the area. In one area, a microdrill in

147



Details of the headband, depicted in the above picture

Fig.18 : Headband and waist ornament in Grave 274 (cemetery 5). **(***C.Jarrige*)

343

In Burial 281 the headband is even more spectacular.
An interesting and quite ingenious method
The numerous dentalium segments have been woven
for the production of steatite beads was invented in
in a netting way (Fig. 19).Period III. Steatite was heated to make it more malleable, then squeezed through a thin metal tube. As
the soft material emerged, it was cut, creating a thin
A belt-like ornament was also uncovered around
wafer type bead. The process was used at

the waist of a male in Tomb 279. It consisted of

ferred to the urban populations of the Harappan Civilization. A shell industry using conch shells (*Fascolaria trapezium* and *Turbinella pyrum*) continues from Period II contexts. Fragments of *Turbinella*

23 long cylindrical shell beads and of a lozengeshaped mother-of-pearl pendant. Another most spectacular discovery in this grave was a rather large rounded lapis lazuli bead found near the chin of the decease.

A very young child was also uncovered adorned with necklaces made up of dentalium shell and steatite beads as well as anklets in polyhedral shell



beads. Two heaps of red ochre were placed on each side of the skull in Tomb 578. The large size of the ornaments indicates that originally they

pyrum, some incised, have been found. A bangle fragment was decorated with incised parallel lines.

A cylinder bead in terra cotta was found in one of the compartmented buildings of Period II. When rolled out, this bead produced an impression much like that of a cylinder seal. The motif is regular and portrays vegetation. Jarrige, Meadow and Quivron have drawn attention to the fact that similar bead seals are also known in western Iran in an early context and the bead from Mehrgarh could be considered as an early prototype of the cylinder seal that later became popular in Mesopotamia. Other finds in Mehrgarh II include violin shaped human figures of unbaked clay colored with red ochre, animal figurines, grinding stones, mortars, stone bowls, and hundreds of chipped stone tools.

Metallurgy Perhaps the most significant craft was metallurgy. A small amount of metal was found in Periods I and II. Notable is a pin with a double spiral head, an early example of the type; three compartmented seals; and some unidentifiable fragments. A tubular gold bead represents the earliest example of that metal found at the site. In Period III evidence for melting, refining, and possibly smelting copper came from a domestic structure. Its floor and walls were heavily burnt, and it is likely that it was used as a firing structure. The walls are made of bricks about 16 × 4 × 4 inches (40 × 10 × 10 cm). The structure was bordered by an open space filled with animal bones, among which were found one complete and thirteen broken crucibles containing copper deposits and stains.

Textile Technology: Against the western wall of a building a fireplace was exposed from which were collected several hundred charred seeds, some of which have been identified by L. Costantini as grains of cotton *(Gossypium* sp.). The large number of cotton seeds in this fireplace perhaps means that we are close to a ginning area for cotton, the seeds having been used as fuel. This discovery is the earliest known occurrence of cotton at an archaeological site (25). Woven cotton cloth was found at Mohenjo-daro and the finds at Mehrgarh may be an indication that the use of cotton, possibly its cultivation, reaches to the very beginnings of food production and domestication in Pakistan. This topic has already been discussed in some details in the last Section.

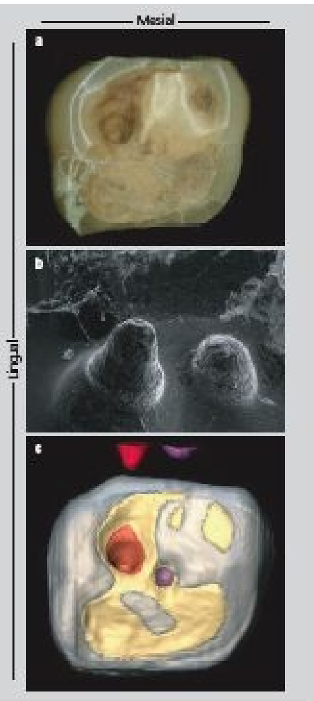
Dental Work: Evidence of Early Dentistry: A fascinating recent discovery at Mehrgarh is in the field of ancient dentistry. In fact, if we believe all the details, including the chronology, it becomes outright incredulous. It is known that despite the archaeological fascination with teeth, the hardest and best-preserved bones in the human body, no researcher has found evidence for the drilling of teeth before 5,000 years ago; the earliest previously known evidence of dental work was a drilled molar found in a Neolithic graveyard in Denmark dating from about 3000 B.C. Well, Coppa and colleagues (30) have found several drilled teeth from Pakistan that date to 7,500 years ago!



Above is an experimental reconstruction photos of a probable method for producing the drilled molar crowns found at a 7000-9000 BP Neolithic graveyard in Mehrgarh

(AP Photo/Luca Bondioli, Pigorini Museum, Rome

The researchers found 9 individuals from early Mehrgarh graves with a total of 11 teeth with conical, trapezoidal, or cylindrical holes 1.3 – 3.2 mm in diameter and 0.5–3.5 mm deep. Scanning electron microscopy showed concentric ridges on the insides of the holes left by the drilling tool. Four teeth show signs of decay associated with the hole, which indicates that the drilling was for therapeutic reasons. Three drilled teeth came from the same individual, and another tooth was drilled twice. DrillA Prelude to Civilization



A drilled hole looms large on the chewing surface of this tooth discovered at Mehrgarh *(A. Coppa, et al. Early Neolithic tradition of dentistry, Nature 440, April 6, 2006)*

ing occurred in cheek teeth, indicating that the dental alterations weren't intended for display or decoration. All nine of the Mehrgarh dental patients were adults and ranged in age from about 20 to over 40. Most of the drilling was done on the chewing surfaces of their molars, in both the upper and lower jaws. The drilling may have been done to relieve the pain and damage of tooth rot.

It was clear that the holes were not made for aesthetic reasons, given their position deep in the mouth and on the erosion-prone surface of the teeth. While there was no evidence of fillings, the researchers believed something was used to plug the holes because some of them were bored deep into the teeth. What that filler substance was is unknown.

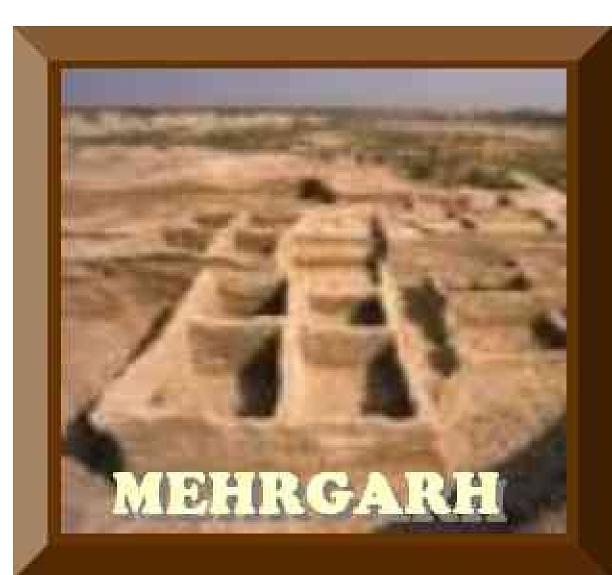
The inhabitants of Mehrgarh attached sharpened flint or a microdrill to wooden rods and used the instruments to fashion beads out of shell, turquoise, and other materials. "Presumably, knowhow developed by skilled artisans for bead production was transferred to drilling teeth in a form of early dentistry," (30). Wielding a flint-tipped model of the prehistoryic tools, members of Coppa's team drilled holes in cheek teeth on a modern human jawbone at a rate of about one per minute. Analyses with a scanng electron microscope and a computerized-tomography scanner identified concentric ridges on the inside walls of the holes in the teeth, just as they were found in the teeth of Mehrgarh.

To quote the lead author of the report, David Frayer: "This is certainly the first case of drilling a person's teeth, but even more significantly, this practice lasted some 1,500 years and was a tradition at this site. It wasn't just a sporadic event". The 1,500-year-long tradition of drill work at Mehrgarh appears not to have been passed down to later cultures. There is no evidence that the Chalcolithic, or Copper Age, people who next lived there ever visited the dentist. Why the practice came to a halt is not known.

Summary: The inhabitants of Mehrgarh took some care in their burial practices and the children who died young (not necessarily infants) were obviously considered as worthy of the same generosity as

were the adults. There may even be some glimmer of social differentiation among the interments of Mehrgarh, some of which seem to be comparatively rich. There is strong evidence for the interconnectedness of the people of Mehrgarh with those of the surrounding areas, especially the areas to their West, from the very beginning of the settlement. These far reaching contacts are indicative of the fact that the early villages of the Greater Indus Region were not small, parochial affairs, stuck in the narrow rut of their own surroundings. On the contrary, these people, and those in successive stages, were engaged in contacts with the peoples around them. The great engine of these contacts was almost certainly nomadism and pastoralists of many types, including bards, tinkers, traders and transporters. But there is room here for some touches of professionalism, even at the level of very early societies.

levels 3, 4 and 6 seem to be dwelling places. Seven structures of this type have been unearthedFocus on Mehrgarh (two in Level 3, two in level 4 one in Level 6 and
VI.4. Architecture
two in level 8). The best-preserved and completely excavated ones measures 6,25 x 4,50 meters (House XXVII Level 4) and 5 x 4,20 meters (House XXV level 4) and are composed of two long rectangular rooms.



In Period I, dwellings were found made of simple mud brick, five by four meters on

The four-roomed buildings represent the most popular

the average, frequently subdivided into four or even six

plan used by the inhabitants of Period I. Such

rooms. The floors of these

structures were uncovered in all the levels from

impression of reeds. Ovens

levels 3 to level 9. The mud-brick walls are

and hearths were usually found in the corners of rooms and signs of their use

approximately 30 cm wide (two rows of bricks) and

can be seen as traces of smoke on the plastered

the average size of the structures is 5,50 by 3,75

had a dome, which was traced in its collapsed con

meters. The four rooms have more or less the same

other irregular sizes. They are generally bun

shaped and have finger impressions on their tops. size and often small openings connect the rooms

between themselves and to the outside. Some walls were thin, with only one course of

bricks; others were wider with two or three (25). Compartmented buildings are characteristic

In level 7, two structures with 6 symmetrical rooms

ing over into Period III. They are interpreted as

have been recorded (Fig. 7). The six-roomed buildings

storage facilities. According to the analysis of Jar

rige and Meadow, there is no evidence that these small, compartmented rooms were used for living. Some form of communal storage, or at least a system that extended beyond the needs of a nuclear family, is suggested from the size of these facilities. A case can be made that these rooms may have been entered through the roof as no doors have been found in any of the walls. The building of these period is acceptable. Some of these building spaces were associated with the working areas of steatite objects and bore tools (25).

The upper levels of Period I reveal an increasing number of multi-roomed units separated by open spaces meant both for domestic activities and burials. In the deepest levels one particular room measured 2 m by 1.8 m, with impressions of reed on the floor and a grinding stone. Here too, the walls were made of mud bricks of regular size (33x28x14.5cm), which also carried finger impressions. Hearths were a common feature, just like in the lower levels of occupation.

The same basic kind of architecture is present in Period II as in Period I and the excavation team did a

good job of exposing it. In fact, twentythree compartmented buildings were unearthed in five seasons. These compartments are rather narrow and long. Like in Phase I, no doors to these rooms are present. No habitation debris was found, indicating that these structures were not used for living. Various retaining walls and terracing features have been found to be associated with Period II., one of them rather massive and curved. Domestic

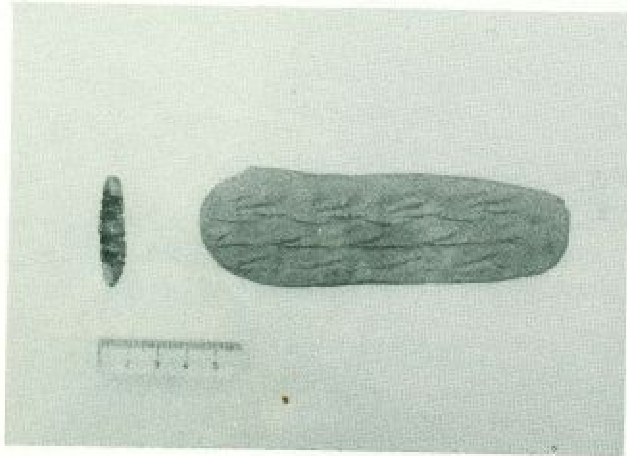


Fig. 4.2. A cylinder bead in terracotta with impression. Period IIB. Fifth millennium BC.

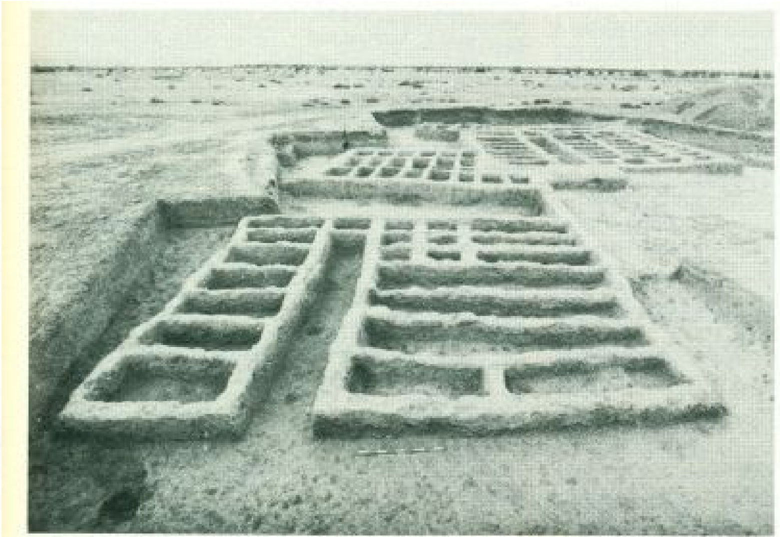


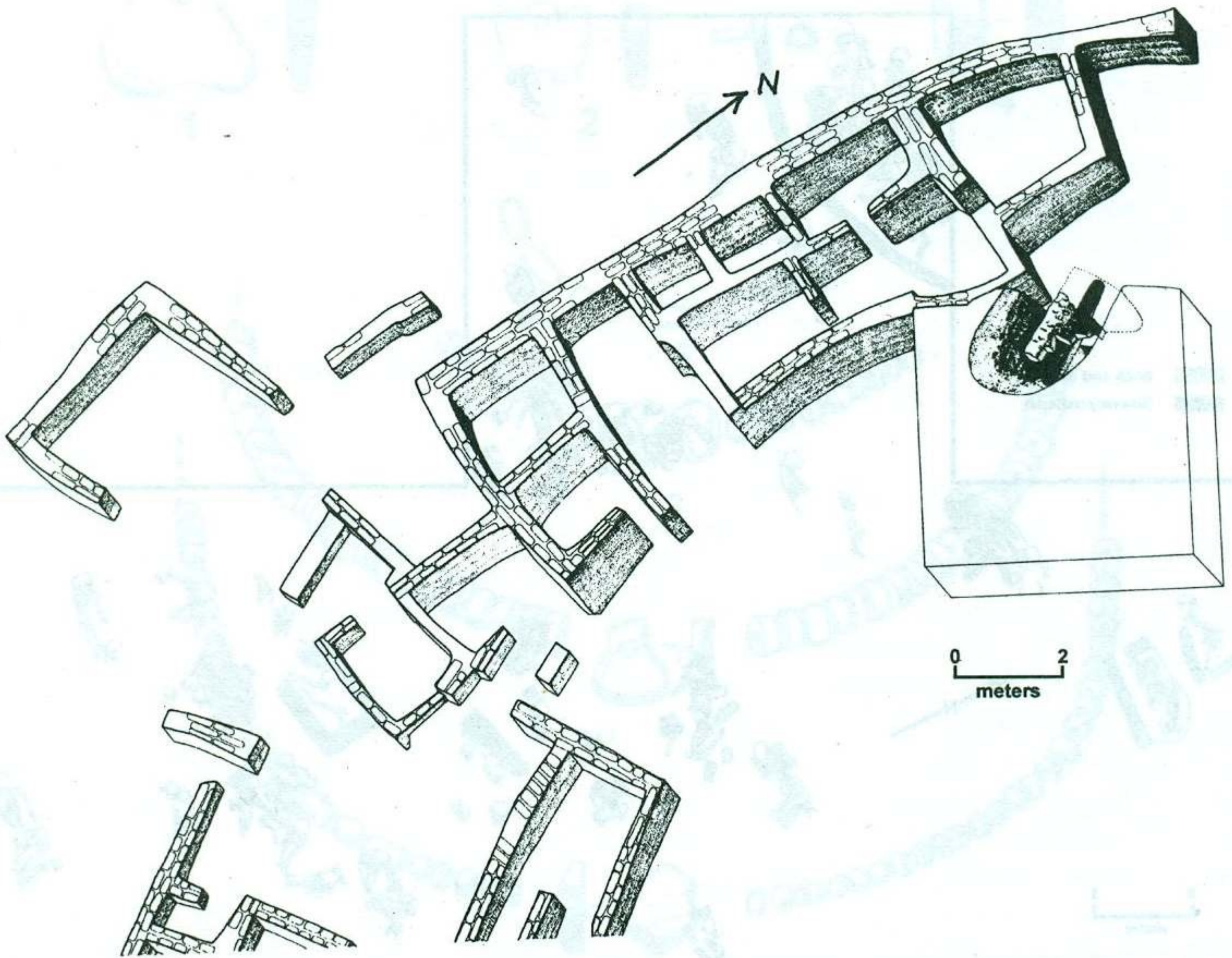
Fig. 4.5. Complex of storage units. Period III. c. 4000 BC.

A complex of storage units, Period IIIC, ca. 4000 B.C. These structures were common in Period II also. Period I: An early example of mud bricks used in the clos © C. Jarrige **ing of graves and building of houses**

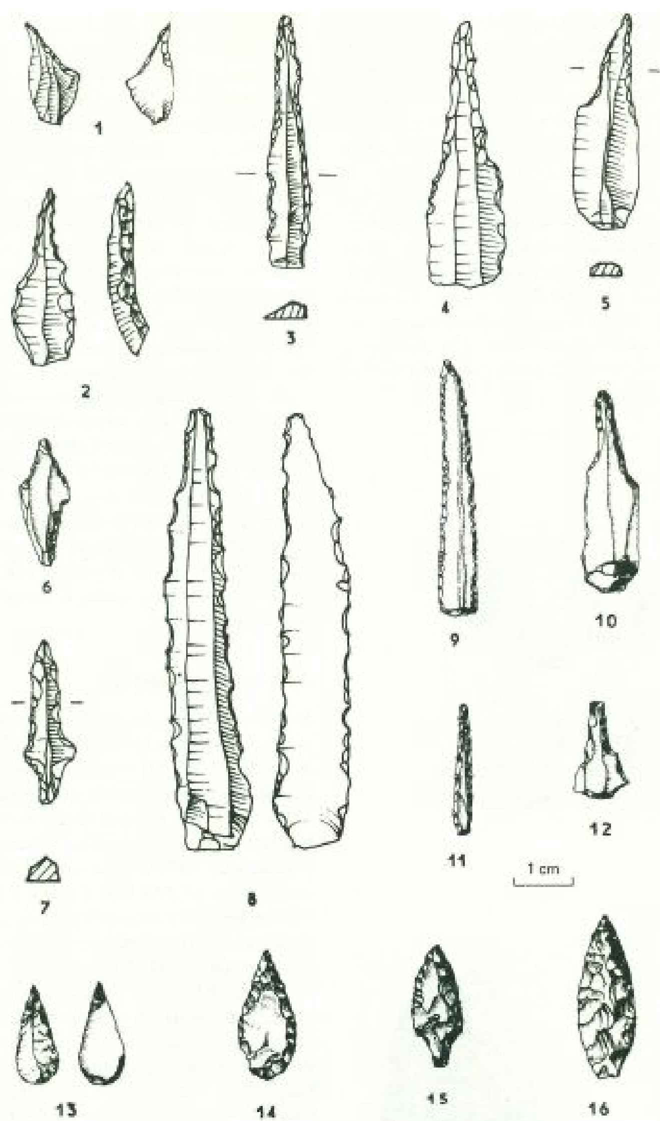
structures on hard clay foundations suggests systematic storage of grains, the seeds of barley having been found in some of the cells. Interestingly, this species of barley is said to grow only in irrigated fields, and thus the idea of a grain storage system in the excavated compartmented buildings of this structures also conformed to those of Period I. One of these buildings is found among rows of compartmented structures. It is a rectangular building subdivided into six rooms. Among these structures of Period II are various flat, hard clay surfaces, some of which were paved with mud-bricks, sometimes associated with fireplaces

A Prelude to Civilization

Various retaining walls and terracing features have been found to be associated with Period II. One of the structures, designated K1, excavated in 1981-82, was part of a terrace built up in connection with the compartmented buildings in the area. "Structure K1 is a massive curving wall with buttresses that were built on the slope of earlier accumulated deposits for the purposeof terracing the top of the mound during the course of Period IIA. The association of this massive and remarkable piece of architecture with the impressive complex of compartmented buildings reveals a degree of planning probably related to well developed social and community organization during the sixth millennium B.C." (25).



Isometric drawing of dwellings of Mehrgarh II, Togau Phase (*after Samzun*)



ig. 7.6. Borers and drills. Per. I : 1–4; Per. II : 5, 8; Per. III : 6, 7, 11; Per. VI : 9; Per. VII : 10, 12. Arrowheads. Per. IV : 13; Per. VII : 14–16.

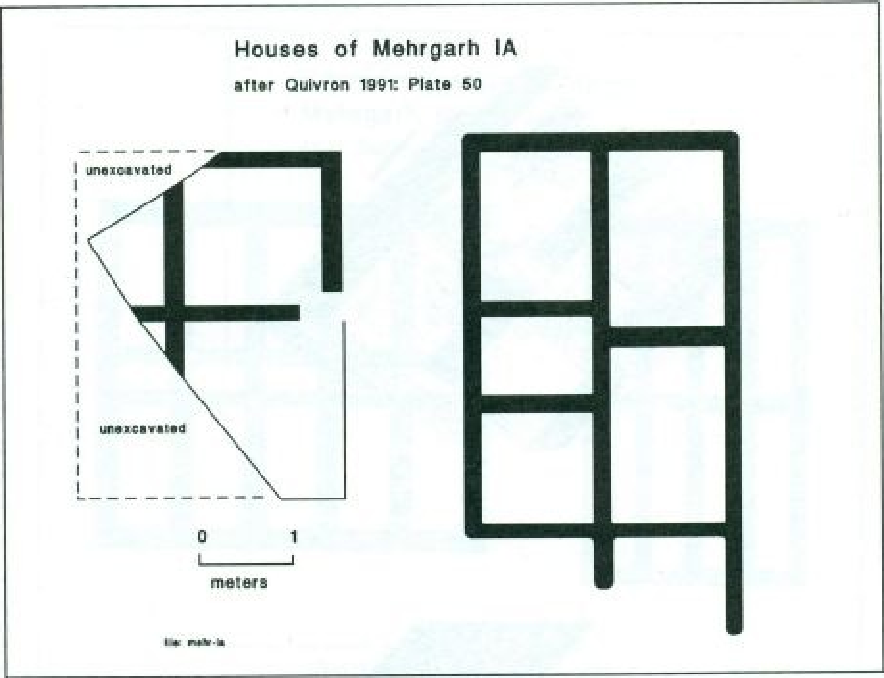
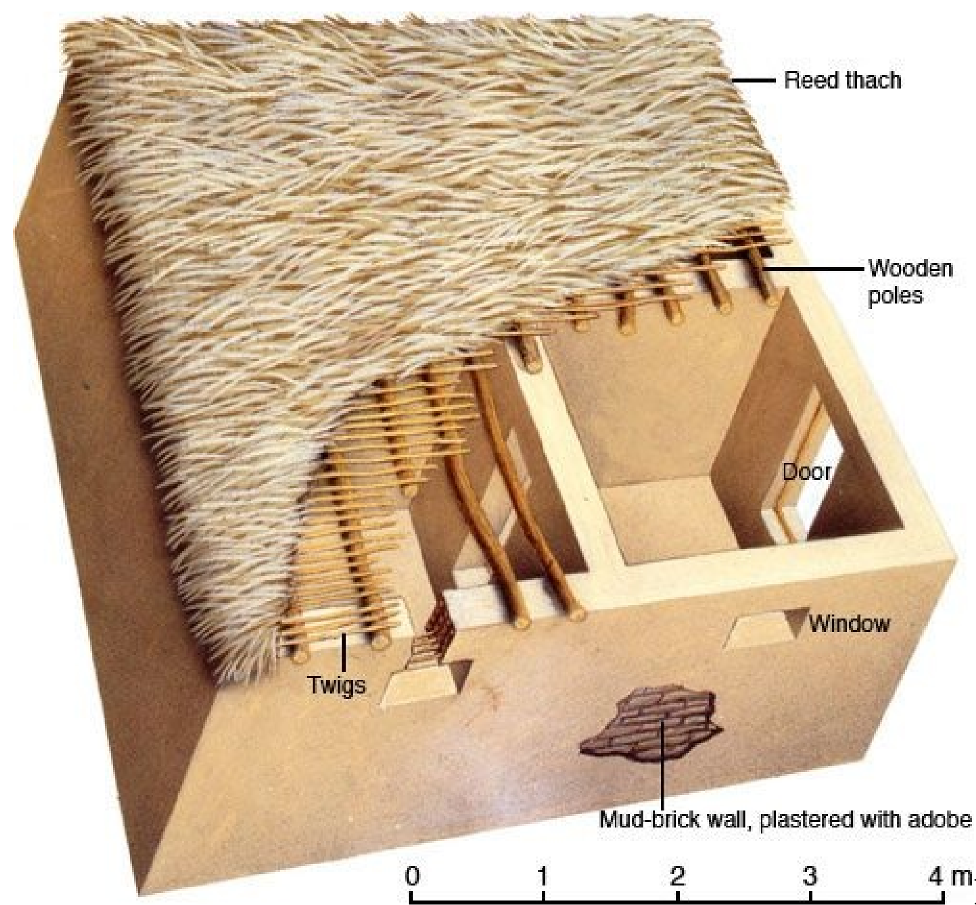


Figure 4.22. Houses of Mehrgarh IA, after Quivron 1991: Plate 50



Reconstruction of a house at Mehrgarh, Period I-II, ca. 6000 BC, per description of Jarrige et al (25)

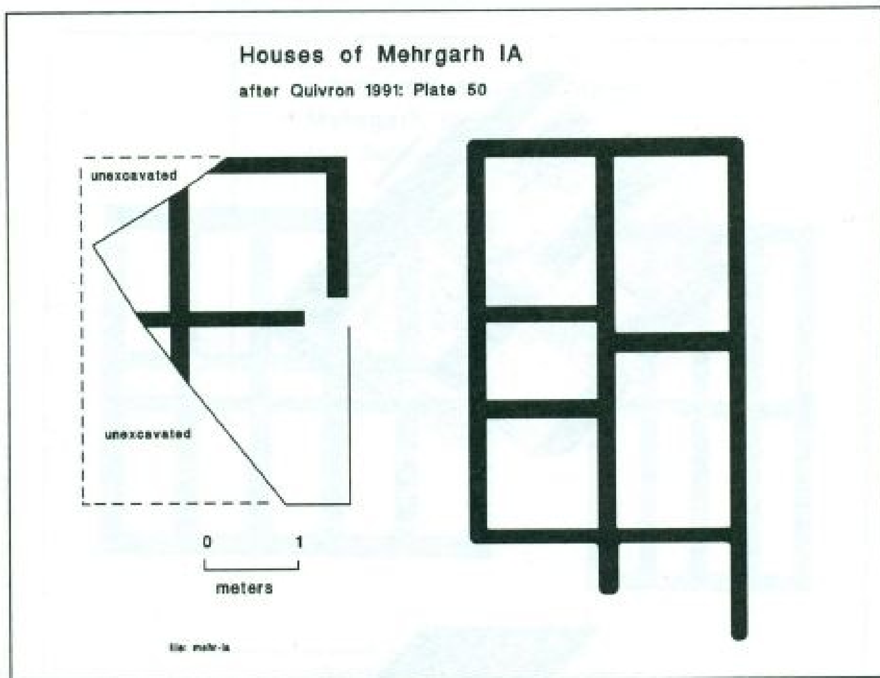


Figure 4.22. Houses of Mehrgarh IA, after Quivron 1991: Plate 50

Houses of Mehrgarh IA

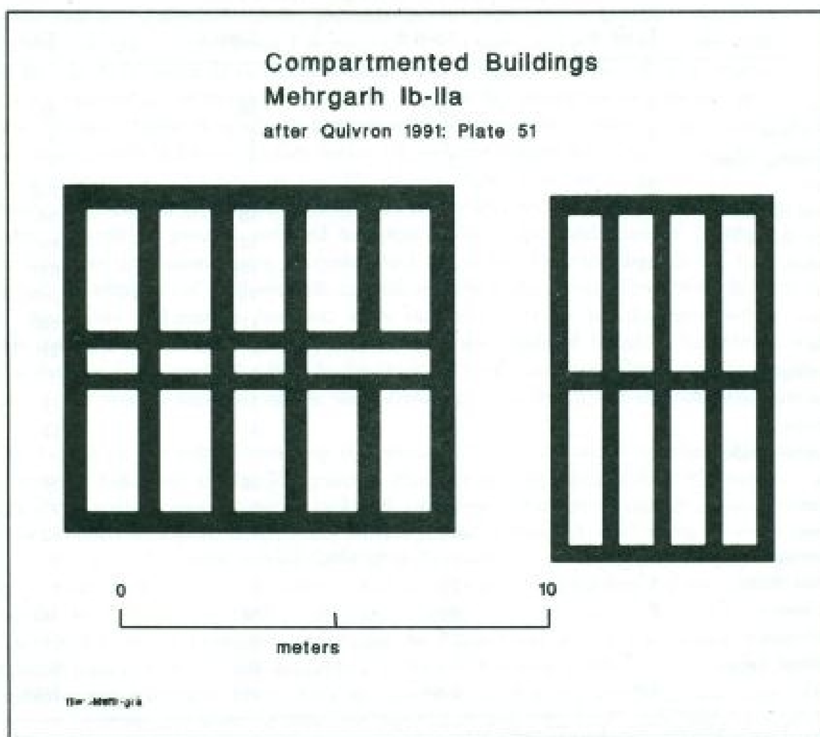


Figure 4.24. Compartmented buildings of Mehrgarh IB and IIA, after Quivron 1991: Plate 51

Plan of compartmented buildings at Mehrgarh IIB (Sixth millennium BC)

Compartmented buildings continued to be built in Period II, they were now larger and more frequent. Jarring et al describe one such stricture, which they designate as Structure L2 : “It is a large structure, 6.2 m x 7.8 m, with walls preserved to 1.3 m. It was built of finger marked bricks, coated with mud. The floor was colored with red ochre. The bricks varied in size. Most were 40 x 10 x 7cm, but bricks that were 42 x 9.5 x 6, 38x9x7, 36.5x8x7, 32x9x5.5, and 31x9.5x6.5 cm also occurred. Finger impressions were present on all of the bricks and they were made in two ways. "The most usual way was to regularly press the thumb in two rows parallel to the length of the wet brick. The second way was to link those two rows with an oblique line made with a finger" (25). A significant amount of charred barley was found at the bottom of the completely excavated rooms in structure L2. This tends to confirm that these were storage facilities” (25). Another compartmented building of Period II was

Figure 4.25. Ceramics from Mehrgarh IB and IIA, after Vandiver 1995: 654

Figure 4.25. Ceramics from Mehrgarh IB and IIA, after Vandiver 1995: 654

completely exposed and had ten narrow compartments symmetrically aligned along each side of a central corridor, reminiscent of the much later Great Granary at Harappa. A small room had been attached to this building on the south and was raised on a small platform of compacted clay. The structure as a whole covers an area of fifty-six square meters and was constructed with what appears to be attention to symmetry. But, measurements show that this is something of an illusion. The long narrow rooms have dimensions that vary between 1.61 square meters to 2.6 square meters.

The fill in the rooms of this building had no indication of domestic debris. Moreover, there was

 A village near Mehrgarh: a surprising resemblance of the 'modern' houses

partmented structures describe above, the domestic structures in Period II also conform to the standards of Period I. One of these buildings, known as Structure 12, is found among rows of compartmented structures. It was a rectangular building subdivided into six symmetrical rooms.

The floors in this time period have yielded many bones, a relatively limited quantity of flints, and a rather larger number of potsherds (25 sherds). In some housfloors were found, circular fireplaces. In two fireplaces were noted tiny fragments of red ocher that had also colored the ground around. It can be assumed that these fireplaces were used to heat the naturally yellow ocher turning

with those of Mehrgarh in seventh millennium BC

an absence of doors between the small cellular compartments. "A connection with agricultural activities is shown by the discovery made in one of the compartments of two sickles composed of three bladelets shafted slantwise in bitumen. These almost complete sickles, lacking only the now disintegrated wooden parts of their handles, are finds of exceptional interest for our understanding of the tools used for farming activities. The function of the building as a granary is also suggested by a large number of impressions of grains in the fill of the compartments" (25).

“We have rather good evidence showing that most of the buildings exposed in the context of Period IIA, mostly compartmented or cell-units buildings, must have been used as storage units and not as proper dwellings. The cells or compartments are too small to have been inhabited. The absence of any fireplace or remains related to domestic activities on the floors of these buildings makes it difficult to believe that they could have been used as shelters even during the few cold weeks of the year. Features related to domestic or craft activities are always found either outside the buildings often in spaces that could have been easily roofed and used as living quarters or in and around a few larger rooms ...” (25). Like the comit bright red through oxidation. To the

side of one of these fireplaces, a large clay human figurine colored with red ocher was found. On the same floor, two large impressions in wattle of parallel rows of reeds were exposed near two postholes. These postholes and the impressions of reeds were covered by a thick layer of sloping clay full of straw impressions. The density of straw impressions is such that it seems possible that this layer was formed by a fallen thatched roof .

Period II represents growth and continuity out of Period I and there is justification for thinking of them as a single unit. The presence of rectangular houses subdivided into rooms that are contemporary with compartmented buildings is important to our knowledge of the South Asian village

farming community. The presence of significant amounts of craft activity in and among these buildings is of consequence because of the diversity which includes flint knapping, tanning and bead making.

The architecture of Mehrgarh III is based on mudbrik. The same two basic kinds of buildings found in Period II, domestic structures and compartmented structures thought to be storage units, even specifically granaries, continued tio be built. They were now separated from one another, however, The storage buildings has complex plans, the product of a community with a well developed social organization that may be indicative of a redistribution system (25).

Architecture seems to have become fairly substantial in Period IV. One reads of rooms interconnected by doors with wooden lintels and backed by wide (2.60 m wide) mud-brick walls. In one case the door was only 1.10 m high; people apparently had to bend before passing through it. The room they entered was 'covered up with grinding stones, pestles, one storage jar, one huge crushed basin with

ridges and snake decorations inside, fine complete goblets, beautifully painted vessels, flakes, blades and many bones’ (25).

V.5. Human Burials at Mehrgarh



The largest number of human remains prior to the urban phase of the Indus Civilization are found at Mehrgarh. There are also some scattered burials elsewhere and these will be noted within the current discussion. There is a reasonably large bibliography on the Mehrgarh burials including: Lechevallier and Quivron (31,32), Lukacs (33,34,35,36), Seller (37) and Jarrige and associates (25). Possehl has given an excellent summary in his *Indus Age - the Beginning (*18).

Humanburialsarefoundthroughoutat Mehrgarh. For our purpose the burial practices in the deepest levels of the settlement are important as they probably reveal the religious beliefs of the early inhabitants of Mehrgarh and provide us with the material for comparative studies. The burials from aceramic Period IA continue into the ceramic neolithic of later Period IB an then Period II. There are no less than 166 graves, eighty-five from Period IA and early IB and eighty-one from later Period IB and Period IIA. Many of them were equipped with substantial amounts of grave furniture. The burials in the IB and II are more diverse in type and some of them a bit different.

In the deepest levels there are simple pit burials where bodies were put in a flexed position with three-to-five-month old goats at their feet in at least two cases. Basket imprints in bitumen in the grave suggest both the use of such baskets and the

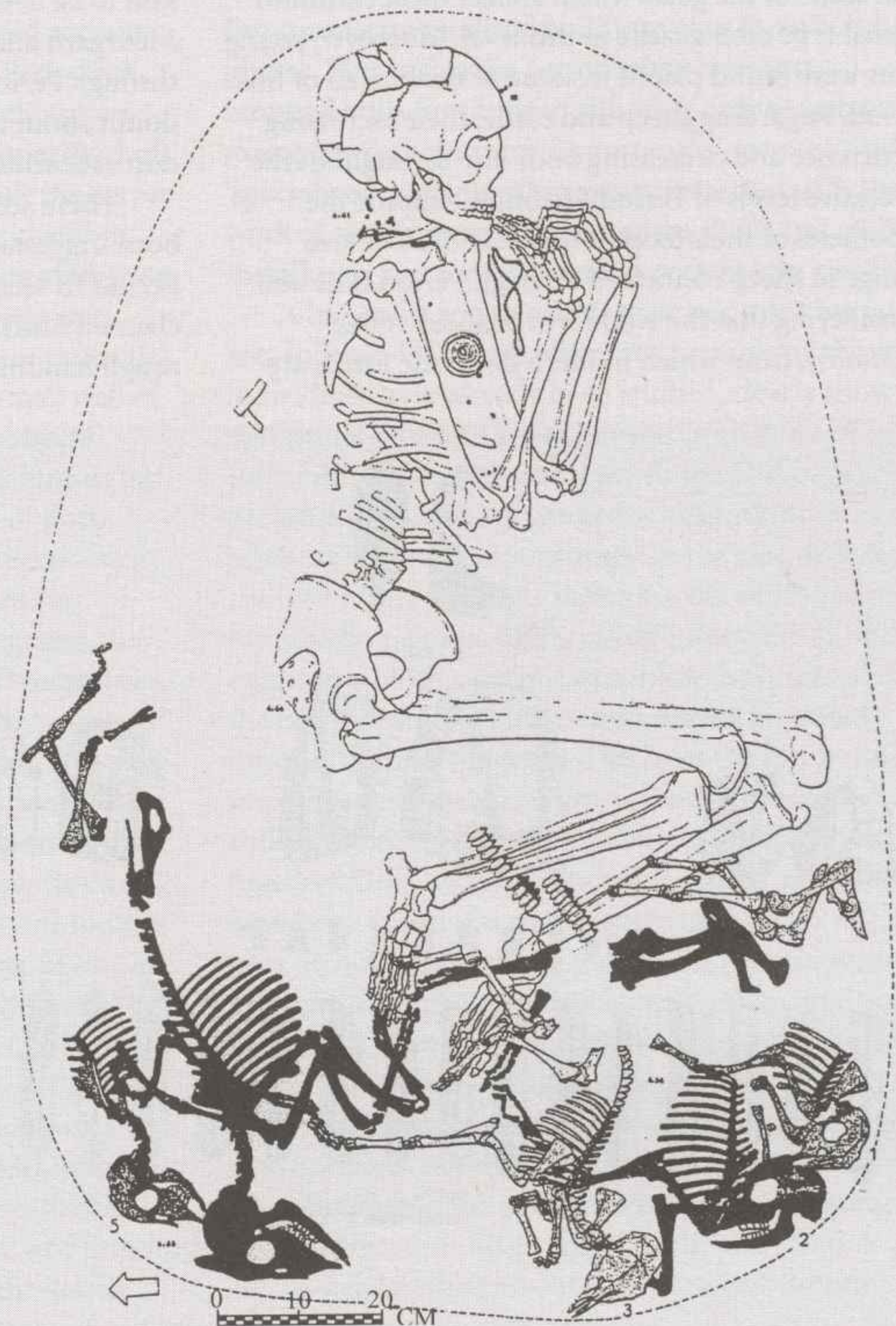


Fig. 6.2: Mehrgarh burial, IA (after Jarrige et al 1995)

hromosomes, and 'hexaploid' with six sets of seven

uncertain, there being no particular evidence of wild

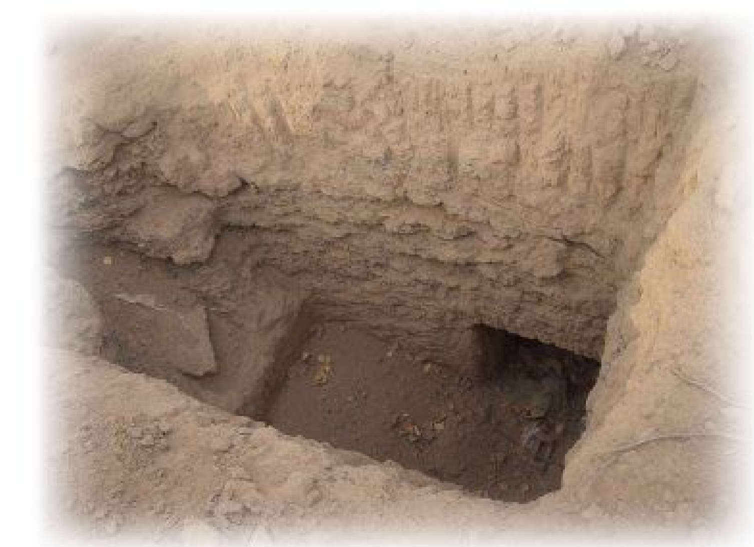
arrangement of food for the dead in them. The bodies often bore personal ornaments: necklaces made of shell and calcite beads and dentalium shells, mother-of-pearl and shell pendants, belts made of steatite beads with bivalve shells, anklets made of calcite beads, bone rings, and more rarely, turquoise and lapis lazuli beads. Turquoise and lapis lazuli suggest that trade or exchange network extended presumably up to northeast Iran and Badakhshan in Afghanistan, whereas dentalium shells would suggest contacts with the coast, about 500 km away. The presence of caprids food to accompany the deceased to an after-life is markedly consistent feature of these interments.

There are secondary burials too, where bone
- sometimes of two or three individuals - were collected after an initial exposure. Another feature is

the occurrence of lumps of red ochre, occasionally put in graves. A bead, presumably made of copper, is said to occur in a child's burial in the upper levels, although this does not denote the beginning of copper-smelting and thus of true metallurgy. According to Jarrige, the end of Period I is unlikely to be much later than *ca.* 6000 BC, and by and large Period II as a whole, inclusive of its phases A, B

Mehrgarh burial IA with skeletons of sacrificed animals
and C, is spread throughout the sixth and the first half of the fifth millennia BC.

The *Lehd* Burials: About halfway through the first period at Mehrgarh the initial settlement area was largely abandoned and erosion took place, which remodeled this human-made landscape and marked the transition between subperiods IA and IB. The older area was turned into a cemetery, with new style interments. The burials are now a bit different and more diverse in type. The most elaborate of these have been termed as "sidewall" graves with the interred in chambers sealed off from an adjoining trench by a brick wall. The grave was first dug 1 meter deep and then at right angle to the size of the flexed corpse. After digging the grave, the corpse was laid in the subterranean chamber which was not refilled but simply sealed by the construction of a special mud-brick wall high enough to close the lateral opening. In this respect, the construction of the grave was quite similar to that of *lehd* which is practiced in most parts of Pakistan and Iran even today.



A general construction of the Lehd burial. The dead body is placed in the side niche and the cavity is then closed by erecting a wall against the opening. This type of grave construction was apparently quite common in the early Neolithic of Pakistan, Afghanistan, Iran, and Central Asia. This construction of grave is still considered preferable all over the Muslim wold compared to the *Shaqq* (pit or trench) burial.

The *lehd* burial, no doubt, is a radical change from the simple pit-burials. In general form, these side-wall graves can be compared with other funerary structures in Iran and Central Asia, especially at Shar-i-Sokhta. Two important points, however, must be noted. First, the graves at Mehrgarh IB are much earlier than the other examples in the area. Second, the details of constructions are so different that no actual historical connections can be formed. Some of these graves were reused. In fact, the first body was compacted into a corner to make use of another one at a later stage.

Sample Burials: Jarrige describes a few burials in some detail: "MR3.180 ...an adult in standard

position alongside a very eroded wall. At the feet were a polished stone axe, a large flint core, a piece of a red ocher lump, a bovine bone, and two fragments of a double-pointed bone tool, a third fragment of which lay in front of the thorax and provides evidence for intentional breaking of the tool before burial. Also associated were two turquoise beads (as a belt) and other bovine bone fragments” (25).

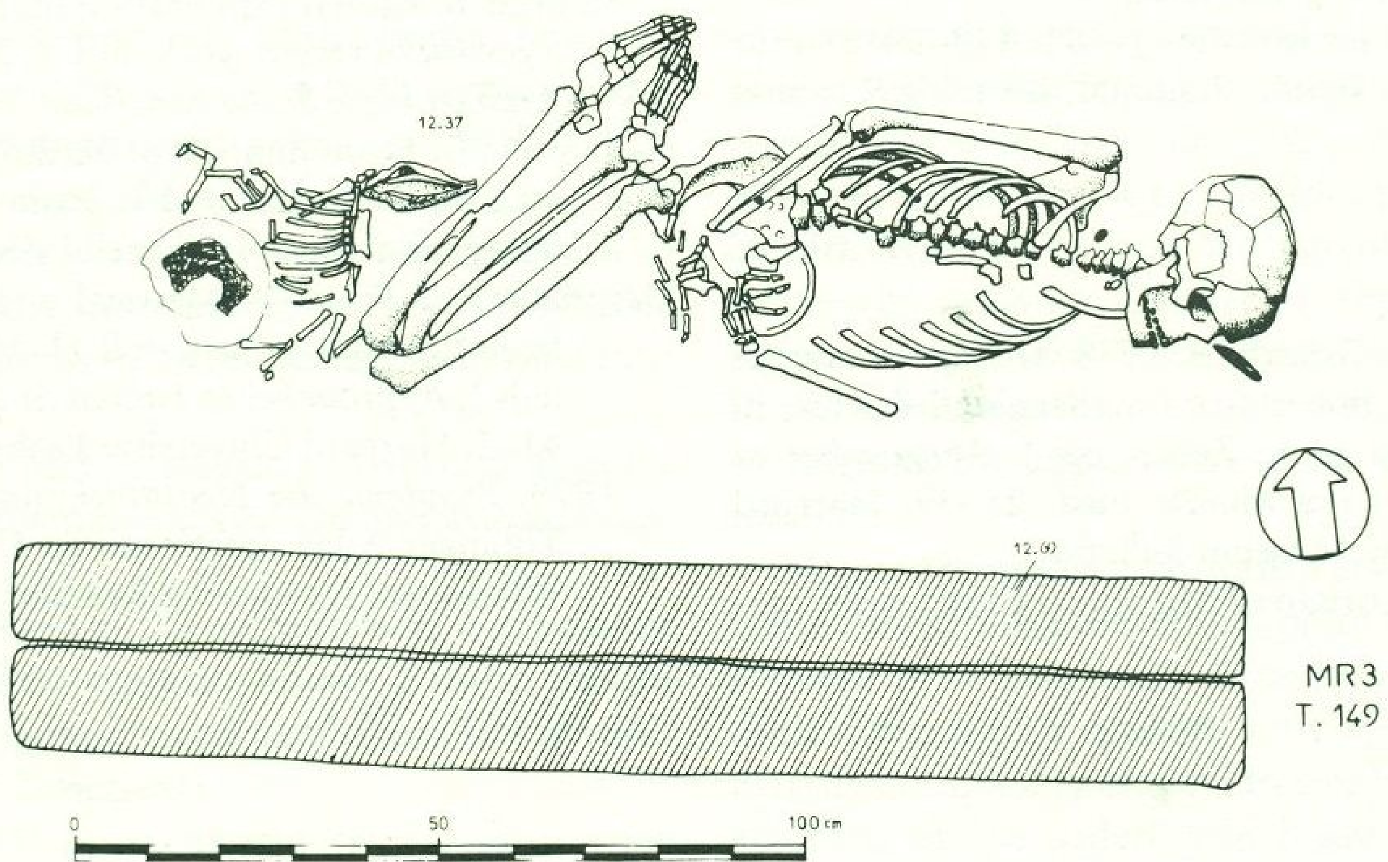
Two of the Period IA burials have been described as: “Locus 287... An adult was found lying in an ocher-stained pit dug from the Level 7 ashy layer into the compact clay below. While digging this pit, an earlier burial with a small child (Homo 290) had been disturbed. Of this burial there remained only some ribs and vertebrae and part of a dentalium necklace. The bones of Skeleton 287 were rather well preserved, and it was possible to consolidate the skull, the pelvis, and a few long bones. The ornaments consisted of one necklace of cut dentalium shells, (135 beads preserved) and another of small circles of white steatite (weathered, with diameters of 5 mm). Connected to this second necklace was a large bead of lapis lazuli. The stone varies in color from bluish-gray to sharp blue and contains impurities. It had been shaped into an irregular cylinder 27.5 mm long with one end rounded and the other square (diameters of 9 and 10 mm). The perforation is transverse, probably because of the hardness of the stone. On the chest of the skeleton there was a large, flat, shell disc (52.5 x 49 x 3 mm) perforated in the center and identical to the one found with Skeleton 283. At the back of the skull were seven small turquoise beads found together of which six were round (diameters: 4.5 mm, thickness: 2-2.5 mm). Finally, there were two anklets made of flat hexagonal calcite beads (the left anklet had 20 beads, the right one 19). The beads measure 19-25.5 x 8-12 x 5-7 mm depending upon their degree of wear, but they are much smaller than the anklets found on Skeleton 283. An offering of five goats, all aged under three months, had been laid at the feet of the deceased. Their disposition in a semi-circle corresponds to the shape of the pit” (25).

“Locus 288...These are the bones of an adult that were badly preserved and completely crushed by the weight of the overburden. The body was flexed with legs drawn up to the pelvis. The arms were bent with the hands in contact with the face. The deceased, a tall individual, had no ornaments, but an offering of five young goats, similar to that of Tomb 287, was placed at his feet. They were laid in a semi-circle partly on top of each other (due to lack of space) and show clearly the edge of the pit” (25).

Interment 114 of Mehrgarh IB has been called the "Craftsman's Grave". This person was evidently put to rest with the tool kit that he made or used in life. It is a wonderful portrait of prehistoric life.

“A narrow oblong pit (about 1-1.5 x 0.6-0.7 m) was first dug about 1 meter deep (for an adult). This provided access to a small funerary 'chamber dug as a lateral cavity at the bottom of the pit in strict conformity to the size of the flexed corpse (indeed, even narrower than a flexed corpse). After digging the grave, the corpse (or already dislocated human remains in the case of a secondary burial) was laid in the subterranean chamber which was not refilled but simply sealed by the construction of a special mud-brick wall (sometimes laid partly upon the corpse) high enough to close the lateral opening. During or after the building of the wall, the pit was filled with sediment. If the grave was reopened after some time (for instance, to add another corpse), the access-pit was dug again and the wall dismantled so as to gain access to the still unfilled funerary chamber. After these mortuary acts (second deposit, corpse reduction, etc.), the funerary chamber was closed again by a new mud-brick wall and the pit filled up again” (25).

“MR3.166 ... a double burial of exceptional type with skeletons of one adult (166-A) and one infant (166-B), both incomplete and dislocated but with noticeable partial articulations and providing evidence for true secondary burial (reinhumation or inhumation after some body tissue decomposition). This burial revealed, for the adult, the interesting



***Lahd* type tomb, MR3.180 with the position of the lower row of mud-bricks and reconstructed location of the side of the small funerary chamber dotted line**

practice of an intentional arrangement of the bones in an attempt to reconstruct the skeleton in standard anatomical position (but facing north). In the process of redeposition and arrangement of the body, some important anatomical errors were made. For example, the left tibia-fibula was placed with the right femur and the lumbar vertebrae near the skull. A bitumen-coated basket was found at the western end of the grave” (25).

Another burial of Period IB was of a child, and quite rich in material .
“...the richest grave (tomb 121) contained the skeleton of a child of about seven years of age who wore a headband made of beads of shell and turquoise, a necklace with beads of turquoise and carnelian and steatite, four pendants of mother-ofpearl, two bracelets and two anklets with lozengeshaped beads of calcite, and a belt made of 259 tiny disc-shaped beads of shell with a central pendant of shell. At the feet of the skeleton was found a basket coated with bitumen containing barrelshaped beads of calcite. Another grave contained a heap of bones with a necklace made of beads of shell, turquoise, and lapis lazuli. This is the second time we have evidence for the use of lapis lazuli in the western graveyard. In a few instances the bones were colored with red ocher. It is also interesting that the graves were often built on ashy floors. These ashy floors were very flat and clean of any domestic refuse. It seems likely that such cleanliness can be identified with some funerary practice. Outside the graveyard area a small conical figurine in clay was found. Its upper part is

pierced by holes indicating eyes and some applique discs probably represent a necklace” (25).
A few burials were found in and among the compartmented buildings. These were generally just below the surface and some appear to have been disturbed by erosion. This, plus the paucity of associated artifacts makes dating these remains difficult, but they appear to date to Period II (25).
Change in Period III: A large and apparently densely occupied burial area in Period III, from where the remains of about 99 individuals have already been studied. They clearly show a change in the burial practices from those of Period IB. The walls made of 'cigar-shaped' mud-bricks in Period IB graves are completely missing now. In fact, it is not sure if the flexed bodies of this period were laid in the ground with any kind of mud-brick architecture. Interestingly, in case of about 25 per cent of the complete skeletons, the skulls are found resting on one mud-brick, called 'pillow-brick' by the excavators. With only one exception, the orientation of the body is east-west but occasionally it is turned towards the left, when the skull faces the south.
An important additional feature is the discovery of a collective burial where some individuals have been put together. Only two pots, both wheelmade and painted, have been found placed in a grave (female no. 91), but pots do not figure among the grave-goods elsewhere in this period. Similarly, a circular compartmented stamp-seal of copper/ bronze placed near the skull of female no. 33 is an isolated example. Personal ornaments - mostly steatite micro-beads fashioned into bracelets, necklaces and head-ornaments-are frequent among the grave-goods. In some cases there are pendants - worn either alone or with steatite micro-bead necklaces of lapis lazuli, carnelian, turquoise, chrysoprase, agate, terracotta and perforated sea shells. **Dental Characteristics:** A detailed study of the skeletal biology of the large number of skeletons excavated at Mehrgarh has not been published but Lukacs and his associates have published some analyses of their dental remains (33,34,35,36). There is low incidence of dental caries in the early levels of Mehrgarh, which may be due to the high fluoride content of the drinking water available in the area. The tooth crown size in this series is megadont, i.e. large, which seems to indicate that 'the aceramic Neolithic occupants of Mehrgarh consumed a coarse diet that was suited for large dental structures.' There is also evidence of interproximal

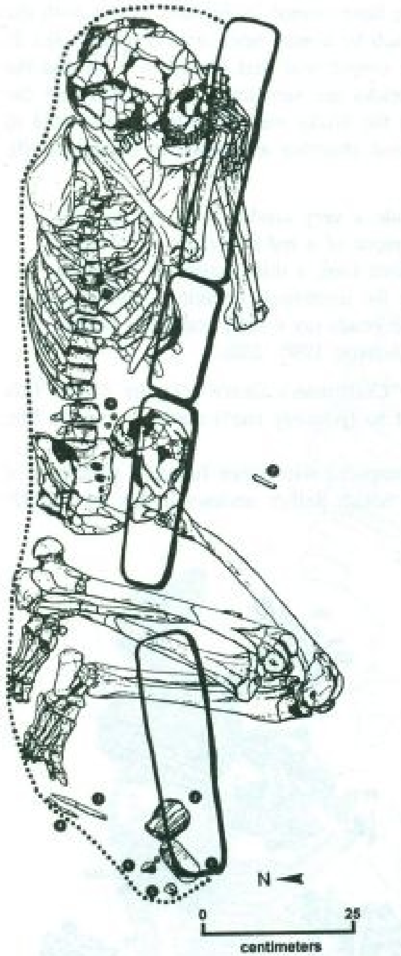


Figure 4.39. Tomb, MR3.180 with the position of the lower row of mud-bricks and reconstructed location of the side of the small funerary chamber dotted line, after Sellier 1992: Figure 30.3

Mehrgarh area MR3, Tomb 149, Period I. Contracted burial laid alongside and facing wall with sickle blades set in bitumen at head, caprine and basket impression

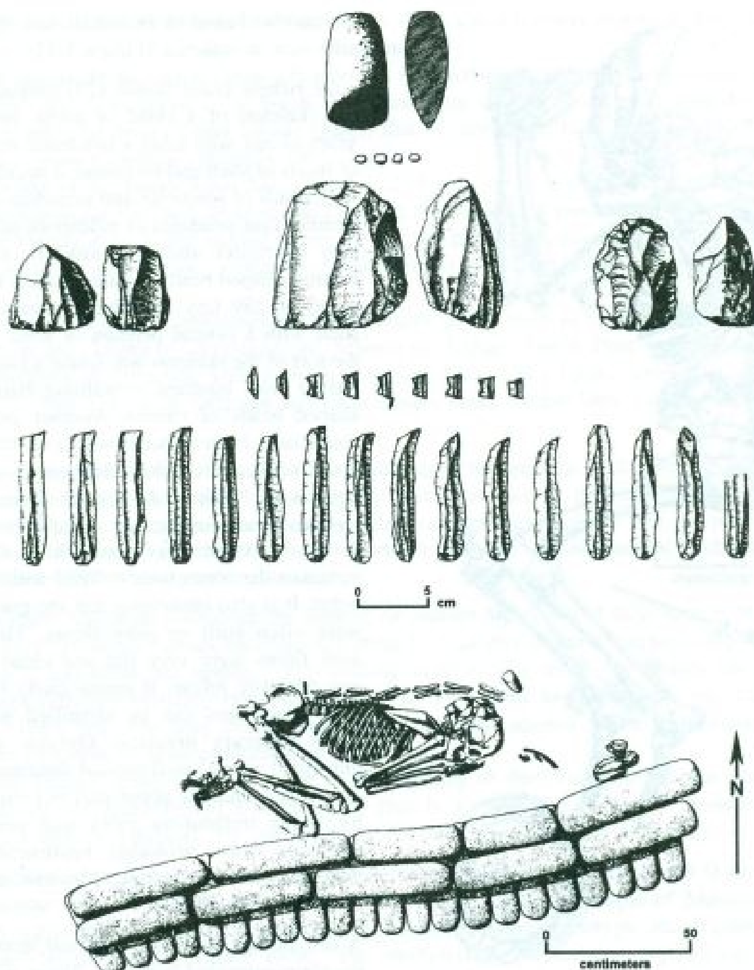


Figure 4.41. The Craftsman's Grave (114) with a polished stone axe, four turquoise beads, 3 flint cores nine geometric flint microliths and 16 flint blades, after Jarrige, Jarrige, Meadow and Quivron 1995: 261

inhumation after some body tissue decomposition). This burial revealed, for the adult, the interesting practice of an intentional arrangement of the bones in an attempt to reconstruct the skeleton in standard anatomical position (but facing north). In the process of redeposition and arrangement of the body, some important anatomical errors were made. For example, the left tibia-fibula was placed with the right femur and the lumbar vertebrae near the skull. A bitumen-coated basket was found at the western end of the grave (Jarrige, Jarrige, Meadow and Quivron 1995: 520).

The 'craftsman's grave' from Period II with a polished stone axe, four turquoise beads, 3 flint cores, nine geometric flint microblades and 16 flint blades

grooves in the dentition of the neolithic people of Mehrgarh, which may be due primarily to 'habitual tooth probing' to alleviate dental pain or may have something to do with the production of sinew and fiber. The dental health deteriorates in Period III when there is a general increase in the prevalence

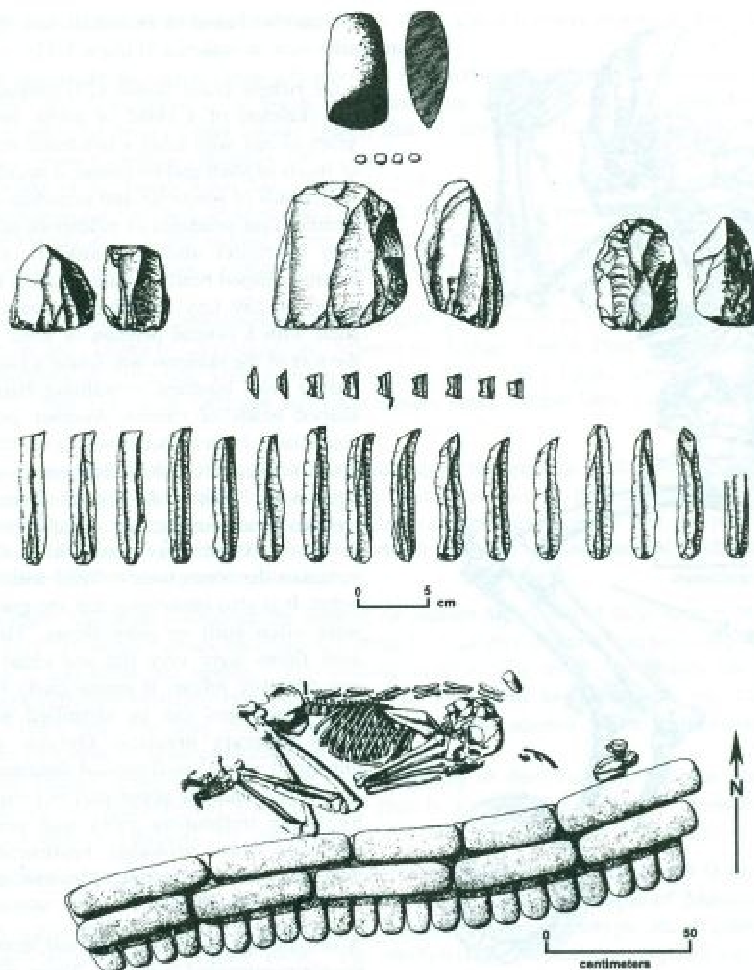


Figure 4.41. The Craftsman's Grave (114) with a polished stone axe, four turquoise beads, 3 flint cores nine geometric flint microliths and 16 flint blades, after Jarrige, Jarrige, Meadow and Quivron 1995: 261

inhumation after some body tissue decomposition). This burial revealed, for the adult, the interesting practice of an intentional arrangement of the bones in an attempt to reconstruct the skeleton in standard anatomical position (but facing north). In the process of redeposition and arrangement of the body, some important anatomical errors were made. For example, the left tibia-fibula was placed with the right femur and the lumbar vertebrae near the skull. A bitumen-coated basket was found at the western end of the grave (Jarrige, Jarrige, Meadow and Quivron 1995: 520).



Mehrgarh area MR3, Tomb 149, Period I. Contracted burial laid alongside and facing wall with sickle blades set in bitumen at head, caprine and basket impression in bitumen at base

of dental disease such as increased dental caries, antemortem tooth loss and dental abscesses. This has been ascribed to a possible sophistication in the food preparation methods during this period.

Lukacs found that the followings pertained to the population at large:

1. dental fluorosis in permanent teeth of skeletal remains from MR2 and MR3 in association with a low prevalence of dental caries,

2. high frequencies of gross enamel hypoplasia and calculus formation in the MR3 permanent teeth,

3. the largest Tooth Crown Areas yet reported for permanent and deciduous dental samples MR3) from prehistoric contexts in South Asia, justifying the use of the term megadont, and

4. a healthy deciduous dental sample (MR3) that is caries free, lacks evidence for fluorosis and gross

enamel hypoplasia .

The significance of the enamel hypoplasia is not fully understood but may be related to the high amounts of fluorine, a degree of malnutrition and decreased calcium intake.The shape and other morphological characteristics of the teeth of the people of early Neolithic stage at Mehrgarh are extremely interesting, as outlined in (35). First they are large and have a complex micropattern with high frequencies of accessory cusps, wrinkles and stylids. This pattern is different from the simple teeth of the later inhabitants of Sarai Khola "...it is very *unlikely* that the magnitude of difference between the Mehrgarh and Sarai Khola dentitions is explainable by evolutionary transformation. Breeding populations from different lineages are undoubtedly being sampled, and suggest that the people of Sarai Khola are genetically distinct from the Neolithic inhabitants of Mehrgarh (35).

In comparing the teeth of the human population of Period I at Mehrgarh with those of Natufians Lukacs observes that there is: "...a *distant* genetic relationship between the Natufian and Mehrgarh samples. This finding suggests that these two groups are derived from rather different breeding populations and that gene flow between them was little and indirect" (35). This may be one more reason to argue against a simple demic diffusion model for the development of food production in the Greater Indus Valley.

Summary: The inhabitants of Mehrgarh took some care in their burial practices and the children who died young (not necessarily infants) were obviously considered as worthy of generosity as were the adults. There may even be some glimmer of social differentiation among the interments of Mehrgarh. The evidence for long distance trade in early Neolithic times comes from these interments, some of which seem to be comparatively rich. These far reaching contacts are indicative of the fact that the early villages of the Greater Indus Region were not small, parochial affairs, stuck in the narrow rut of their own surroundings. On the contrary, these people, and those in successive cultural development stages, were engaged in contacts with the peoples around them and the more distant neighbors of these folk. The great "engine" of these contacts was almost certainly nomadism; pastoralists of many types, including bards, tinkers, traders and transporters. But there is room here for some touches of professionalism, even at the level of Period I and II societies, especially for the harvesting of seashells and mining of some of the more exotic minerals, such as lapis lazuli and turquoise (18).

V.6. Neolithic Sites Beyond Mehrgarh



So far Mehrgarh has taken all of our attention because it is one of those early settlements where the

inhabitants of the Greater Indus Valley began to adopt agriculture and animal herding as their base of subsistence. Mehrgarh was, however, not alone in this process

of transformation: there were other sites the inhabitants of which were equal participants in the forsaking life of foraging and adopting a life of sedentary living. A few of these we know from archaeological surveys or excavations but some others, we are sure, have evaded our detection. A lot more are the sites where the Neolithic cultures, with concomitant agriculture and animal herding, thrived. While the settlement at Mehrgarh merits extensive consideration, it should not be perceived as a unique site. There are indications, not yet fully explored, that other equally early sites may exist in other parts of Baluchistan and elsewhere on the eastern and northeastern margins of the Iranian Plateau.

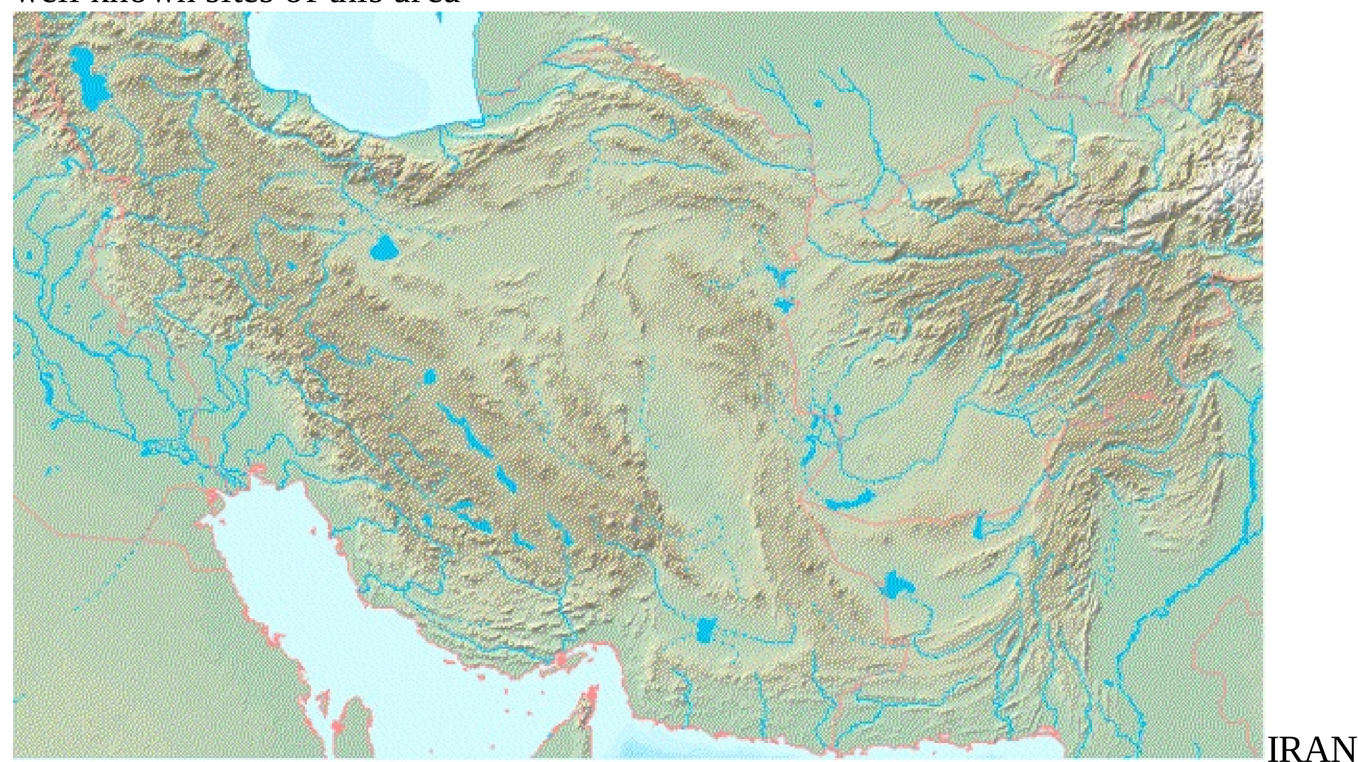
These Neolithic sites defy a neat chronological periodization, cultural classification, or geographical categorization, despite our efforts to arrange some of them into a system of cultural ‘stages‘, discussed in the next Section. Here we venture to undertake a general survey, which is largely geographical in nature. Although our focus is the early Neolithic settlements, it is difficult to define a purely Neolithic settlement and distinguish it from a village farming society. This distinction is, however, not important in the present context as we are primarily interested in our study of the way to the Early Indus villages which ultimately led to the urban society in this part of the world, a truly expansive civilization that we call the Harappan or the Indus Civilization. As will be evident from the following survey, the Neolithic sites are concentrated only in those areas which are still agriculturally viable or lie on arterial routes of the region.

Mehrgarh is the chief representative site where the excavations carried out by J-F. Jarrige and his team in 1970s and 1980s revealed a continuity in the growth and consolidation of village life which gradually merged with the urbanized Harappan culture later. The pre-pottery Neolithic phase of Mehrgarh, currently crucial to the understanding of the growth of barley-and-wheat-based agriculture in Pakistan, is only a prelude to the efflorescence of village life over a vast area from Baluchistan to the hilly terrain on the west side of the Indus in the Pashtun country and northern Punjab.The chronology is elastic but is most visible between *ca*. 5000 BC and *ca.* 3000 BC, and in some areas somewhat later.

We have seen in the foregoing chapters of this Section that after the domestication of cattle, sheep, goat, and the cultivation of barley (if not wheat) at Mehrgarh, one witnesses the steady and continuous development of village life at this site. It will be seen here that once agriculture begins in other areas, we witnesses the same process. Although cultural connection of the new agricultural settlements with Mehrgarh and other sites of this nature is not absolute or not even exclusive, there must have been a fair amount of contact between all the component areas of not merely Baluchistan but also of the wider Oxus-Indus interaction zone of which Pakistan was a part. Detailed comparisons between artifacts, especially pottery, found in the archaeological columns of different component areas is out of place here, but the parallels in the pottery styles of the Quetta valley and southern Turkmenistan are well known, and so are the parallels between the Rana Ghundai II pottery and the pottery of Hissar and Sialk in Iran. The story of the growth of wheat-barley-cattle-sheep-goat agriculture in Baluchistan, although independent to a large extent, is in a sense part of the agricultural growth in the Indo-Iranian and Turanian borderlands as a whole. If we take the concept of an ‘expanded core region’ for the origins of agriculture and animal domestication seriously, then this interaction zone must expand to the Near East on one hand and central Asia on the other.

Baluchistan figures most importantly in this survey, especially the eastern and southern extension of the Iranian Plateau. It is a dry zone of scarce water resources and extremes of annual temperature. Treeless hills rising to 1,500 meters are separated by valleys oriented to the northeast or southwest. The Sulaiman mountains join the hilly country east of Kandahar in Afghanistan to the high country and deep valleys of Baluchistan, a region marked by desert passes that have been the major corridors of commercial and military communication for many millennia in the past. Agriculture along the valleys *of* the Zhob, Ambar, Hab, and Porali rivers in eastern Baluchistan continues today, as it has for the past five to six millennia. The Quetta Valley and the Kachi plain is the gift of the Bolan and its many but small tributaries. In the northern reaches of the Gomal valley and along the Makran coast, however, neolithic populations heavily concentrated Artesian wells and springs were a supplementary water source in many valleys to the intermittently flowing streams fed by summer and winter rains and snow.

The discoveries of the Neolithic sites in this area is melodramatic, adventurous, and haphazard The well known sites of this area



IRAN

are Sur Jangal, Dabar Kot, and Rana Ghundai, all three in the Anambar valley, and Periano Ghundai near the junction of the Zhob with Gomal. A brief study of Periano Ghundai associated

it with 'Zhob mother goddess', a AFGHANISTAN distinct type of goggle-eyed and hooded terracotta mother goddess which occurs generally in

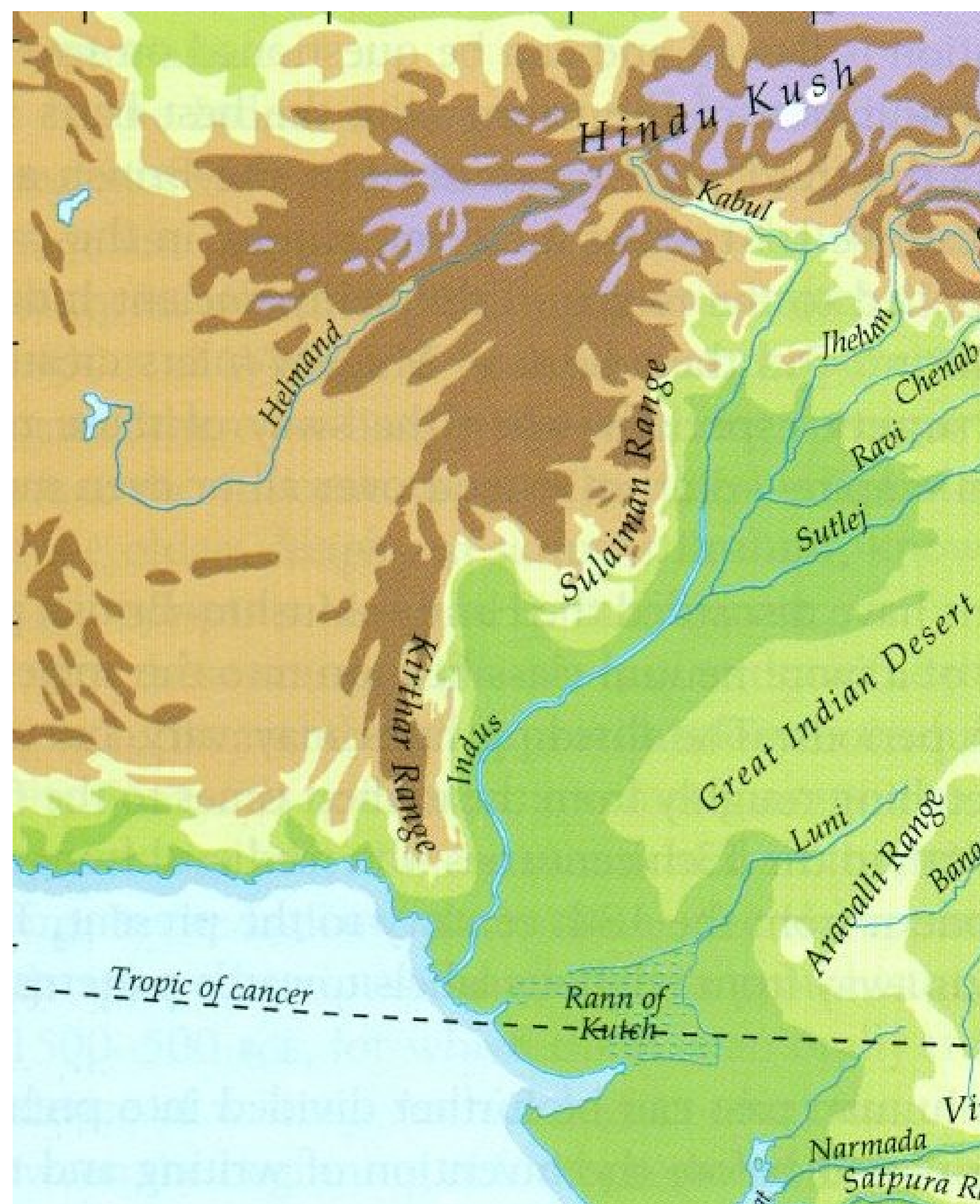
PAKISTAN

the Zhob area but has been found in Damb-Saadat III (DS III) and Mehrgarh VI (MG VI) as well. It is also associated with perforated ware and nail-incised pottery of the Indus Civilization and thus Periano Ghundai as a site is unlikely to be earlier than

at the same time. This story has already been told
by Possehl in his *Indus Age - The Beginning.* It

most likely begins In 1838 when Commander T. E. Carless, a British naval officer, reported the discov ery of rock-cut caves in Las Bela district, west of Karachi. A large contingent of amateur archaeolo gists, adventurers, antiquity collectors and fortune seekers followed before some orderly investigations were carried out at selected sites by European and American archaeological missions in cooperation of the Archaeological Department of Pakistan. The contributions by universities and other institutions of learning were, however, meager.

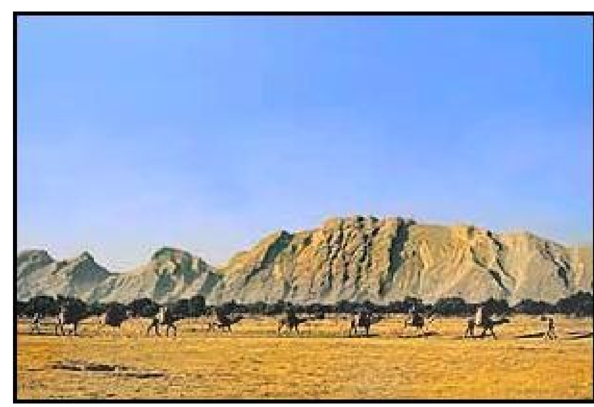
Northeastern Baluchistan: Fairservis' sur veys were conducted in November 1950, during the field season of the American Museum's Second Af ghan Expedition (38). Fairservis and two others (George MacLellan and Sadurdin Khan) were re sponsible for the survey work, which was intended to provide material (i.e., Late prehistoric to Early Indus Valley Civilization) comparable to that pro duced by the Expedition in their Quetta Valley exca vations. The survey was limited in scope; the work was restricted to a three-week period and was con fined to regions easily accessible by autoroads. Only 13 sites in the Loralai area were visited (5 of which were already known from the work of Sir Au



The Sulaiman Mountains and the Kirthar Range in the west of the Indus plains rel Stein, E. J. Ross, or Fritz Noetling, and 4 in the

appear to have been less or practically non-existent. Zhob River valley. Hence, the survey did not result in locating and mapping of any quantity of new sites. Loralai is a town about 100 miles east of Quetta; Zhob is a river about 25 miles north of Loralai. One item suggested by the survey is rather intriguing, however: Fairservis found that the only two Harappan sites now known in the Loralai region both lie in areas which approach to the geographic conditions of the Indus Valley, whereas Baluchi prehistoric sites tend to be distributed in the upland regions. A larger-scale survey would, of course, be needed to confirm or invalidate these apparent tendencies.

the 3rd millennium BC. Among the Anambar valley sites, Sur Jangal in its first phase has been related to Kili Gul Muhammad - IV (KGM IV) and in its later phase to DS II-III. The archaeological assemblage shows small mud houses, terracotta models of houses, Zhob mother goddesses, painted pottery showing both humped and humpless cattle, and an overwhelming prominence of cattle bones. This emphasis on cattle in the economy has been considered to be a feature of the basically herding economy of the upland valley where Sur Jangal is situated. Dabarkot and Rana Ghundai are in comparatively lower grounds. In a trench high on the site of Dabarkot, the artifacts of the Indus Civiliza-


A view of the Zhob Valley with its barren hills and a lowland

In an effort to construct a stratigraphic profile of the mound and thereby establish its association with the post-Neolithic levels at Shahi Tump, Nal, and Bampur and the Near Eastern sites, Ross excavated the northern face of The mound, which had escaped quarrying operations by the local people who transported the ash-laden soil to their fields as fertilizer. The lower stratum contained bones of cattle, sheep, and hemione (ass) along with remains of a newborn human infant. The latter was examined by B. S. Guha and B. K. Chatterjee (1946), who concluded that lack of fossilization was indicative of comparatively recent deposition. There was no evidence of a burial pit, and with the mam

tion were noticed together with Zhob mother goddess figurines. Among all these north-eastern Baluchi sites, only the sequence of Rana Ghundai is better understood, thanks to the effort of Brigadier E.J. Ross who headed the army cantonment of the area. The mound of Rana Ghundai is situated near near Fort Sandeman rises 12m above the surrounding plain and has a circumference of 430 m.

According to Ross, it was 'very unlikely that this area could have supported the settled population indicated by the size and numbers of these sites unless irrigation was practiced to an extent at least comparable to that of the present day'. In view of his long experience of the area, this is a completely dependable opinion. Assuming that the climate of Baluchistan has not qualitatively changed since the beginning of Holocene, irrigation must have been the essential base on which any kind of agriculture could develop and sustain itself in this region. The calibrated range of Rana Ghundai, Period I is *ca.* 4500-4300 BC, whereas the same for the first level of Period III is ca. 3500-3100 BC. mal and human bones were

flint blades and chips, worked bone, ivory points, and an eyed needle. Also present were plain coarse handmade pottery and possible remnants of mud or clay walls of brushwood huts. Ross identified this deposit with a thickness of over 4 m as containing vestiges of continuous occupation by seminomadic or pastoral people of the late third millennium, the antecedents of the chalcolithic peoples whose superior quality wheelmade ceramics, painted with a bull motif, mark the upper levels of the mound. He called the Neolithic level the "pre-Bull" period. Fairservis's inspection of Rana Ghundai in 1950 confirmed Ross's identification of

levels, but his discovery of painted ceramic sherds in the lowest level suggested an association of style with the painted ware at Kili Gul Mohammad II, which is dated to 4000 B.C. or slightly earlier. The mound was abandoned following its fifth cultural phase (recorded in nine strata), prior to the maturation of the Harappan Civilization ca. 2500 BC.

Quetta Valley: The Quetta valley is accessed from the Kachi plain in the south by the Bolan pass. The Khwaja Amran range, with the Pishin Lora flowing below, constitutes the border of Quetta Valley

with Afghanistan. To the east of Quetta and northeast of Kachi, is an area drained by the Loralai, Zhob, Anambar, Thal, Beji, and other mountain streams, beyond which in the northeast is the Gomal valley, separating Baluchistan from the general area of Bannu. The area is bordered on the north by the high chain of the Toba and Kakar ranges and on the southeast and south by the Marri-Bugti country and Derajat territories, Derajat being the land to the west of the Indus between Dera Ismail Khan in the north and Dera Ghazi Khan in the south. To the southwest of Quetta there is a series of hills ar



Goggled-eyed “mother goddess’ of the Zhob Valley

ranged roughly in a northeast to southwest alignment and known as the Ras Koh, Central Brohi, Pab, and Kirthar ranges. These ranges contain the Kalat plateau and the territories of Kharan, Sarawan, Jhalawan, and Las Bela, with the Hab and Mula flowing across the Kirthars and the Purali flow

http://www.bcgalleries.com.au/06952.html ing into the Somiani bay in


Las Bela.
The Quetta Valley is the center of a natural corridor

Edited By admin on 07 september 2003 at 20:42linking southern Afghani_________________ stan to the Indus Valley, via

Er is maar één weg, en dat is de weg van de Waarheid the Bolan and Khojak



passes. Historicallly these factores have made Quetta

a

regional hub of settle Geplaatst: Fri 29 Aug , 2003 8:07 Onderwerp:

ment, trade, and admini **Zhob pottery mother goddess figurine.**



stration. In prehistoric times a distinctive set of archaeological assemblages developed in Quetta-Pishin and the valleys in the immediate north, south and beyond into Afghanistan as at the famous site of Mundigak, even reaching Sahri-Sokhta in Siestan. The archaeological sequence of the Quetta valley is dependent on the excavations at two major sites - Kili Gul Mohammad (KGM) and Damb Sadaat (DS), with KGM IV being contemporary with DS I. By DS II and DS III times, sites have been said to occur almost everywhere in the valley where fertile soil and water exist today, indicating that present climatic conditions and the ecology of the modern Quetta valley are comparable to those of prehistoric times. Here irrigation is dependent on wells and the *Karez* system, where the sub-soil

water available in the lower slopes of the hills is taken to the valley by digging a long underground canal with American Museum of Natural History and the only one with evidence of an aceramic food-producing culture, providing a radiocarbon date of early sixth millennium (39). This was established from charcoal collected from a hearth at the upper portion of the first level. Fairservis, who carried out the field research, hypothesized that the date of an adjacent deposit of the site could be within the temporal frame of the Jarmo and Jericho Neoithic. Subsequent dates for Kili Gul Mohammad I were calibrated within a range of 4500-4,000 B.C. These food producers of Baluchistan built pise-walled huts; herded cattle, sheep, and goats; harvested with sickle blades; planted cereal crops; and manufactured ground axes, flint chips, and chert blades. A crude handmade pottery with basket impressions



did not appear until a later cultural period, Kili Gul Mohammad II, when mud brick houses were constructed.



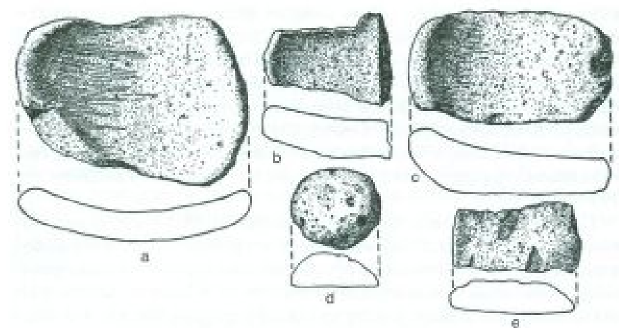


Figure 3.2. Grinding slabs from the Quetta Valley, Damb Sadaat, one-quarter natural size. Courtesy of American Museum of Natural History.

regularly spaced entrance shafts from the top. Most of the Karezes are presently in disrepair and nonfunctional.

Until excavations began at Kili Gul Mohammad, Rana Ghundai was the only Baluchistan site offering a stratigraphic profile of cultural succession in this general area. Kili Gul Mohammad, which lies 18

km north of Quetta city, was one of nearly 40 sites surveyed in the Quetta-Pishin region in 1950-51 by archaeologists sponsored by the







Grinding slabs from the Quetta Valley, Damb Saadat.

Besides Kili Gul Muhammad, Damb Saadat is one of the most important archaeological sites in Baluchistan. It was first investigated as a part of the program of the Second Afghan Expedition from the American Museum of Natural History under the direction of Walter A. Fairservis (39). The site is important for two reasons. Just as at Kili Gul Muhammad, it documents the continuity of occupation in this region of Baluchistan at the top of the Bolan Pass. Damb Saadat also documents significant culture historical interaction between the Indus Valley, norther Afghanistan and central Asia during the Indus Age under the present consideration.

The initial occupation of Damb Saadat is marked by the presence of the same suite of ceramics which characterized the final occupation of Kili Gul Muhammad. There is considerable continuity in the ceramics between Damb Saadat I and II and also from II to III. For detail, refer to Fairservis (39). The ceramics of Damb Saadat II and III are characterized by the prominence of the "Quetta Wares", described in the next Section. There is some architecture in Damb Saadat amounting to a domestic oven built of regularly coursed bricks along with mud and fragments of bricks. This may be a *Tandoor*, so common even today in this region and beyond. Female figurines, some with elaborate dress and adornment made their appearance in the Quetta valley at this time along with compartmented stamp seals. Grinding slabs for processing of grain and other vegetable material are common. All three classes of artifacts carry over into Damb Saadat III. They have parallels at Mehrgarh, in the Zhob sites as well as sites in Central Asia.

Kalat Plateau: The archaeological sequence in this region which lies broadly southwest of Quetta is based on the excavations conducted at the sites of Anjira, Siah Damb, and Togau, the first


Foundation wall with a log of wood, Sohr Damb, Period III

two located in the Sohrab area, roughly southsouthwest of Kalat. The sequence built up is a composite one, that is, derived from work at all sites:

Period I: a semi-nomadic settlement, redslipped pottery and a flake-blade industry.
Period 2: mud-brick buildings on boulder foundations, red-slipped and burnished grey wares, coarse vessels molded in basketry frames.
Period 3: roughly squared stone blocks as house foundations, the earlier pottery declines, appearance of Togau ware (a black-on-red painted ware, with open bowls as a common shape; the bowls are painted with stylized ibexes, goats, and birds on the inside just below the rim) and a bichrome ware, also, Zari ware (painting in white with black outline) which is said to be a variant of Nal pottery, related to KGM IV - DSI phase of the Quetta valley.
Period 4: use of well squared masonry, the occurrence of Nal pottery, related to DS II of the Quetta valley.
Period 5: related to DS II of the Quetta valley.

Anjira is an early farming site in central Baluchistan's Sohrab valley in the Kalat division. Period I at Anjira is likely to fall in the 5th millennium BC but as yet there is no clear reason to infer this date from the data available. Period III, the socalled Togau ware phase may date from the early 4th millennium BC with Period IV dating from its later part. Anjira was investigated by Beatrice De Cardi during her field seasons in 1948 and 1957. She hypothesized that nomadic people from Kili Gul Mohammad occupied Anjira, which is a gravel hillock overlooking the Anjira river, a tributary of the Mula. A flake-blade industry of chert scrapers, gouges, short blades, backed blades, and leafshaped arrowheads was found with a crude pottery with basket impressions and a superior burnished buff and gray ware with a red slip. Decorative motifs on this pottery are comparable to what has been found at Kili Gul Muhammad II. There were no brick or stone structures at this first level at Anjira, but awls and beads were made from cattle and sheep bones. Cross-dating of these artifacts with Kili Gul Mohammad reveals a Neolithic culture of the second half of the fourth millennium B.C., but radiocarbon dates are not available. During period III at Anjira stone walls replaced the boulder foundations of previous houses of mud brick, and new styles of pottery appeared. The stratigraphic succession continues into period V, which is dated to just before the beginning of the second millennium B.C. Erosion has obliterated evidence of later occupation of Anjira. Eighteen kilometers northwest of the site is Siah-damb on the Kej river, a site excavated by De Cardi in 1957.


Pottery from Period III, Shohr Damb

Khozdar Area: An important communication point between north and south Baluchistan, Khozdar, in Jhalawan, is a well cultivated area with wild duck, geese, partridges, deer, and wild sheep and ibex in the vicinity. Lead and antimony were pre-industrially mined and smelted at Sekran in the same area. Nal is a prominent village about 40 km west of Khuzdar. It is located at a communications node and has been a point of settlement for many millennia. There is an archaeological site about seven km to the east of the present village. This is Sohr Damb or Red Mound, which is quite prominent feature of the landscape. It is ca. 309x183 meters in area.

There has been a good deal of digging at Sohr Damb. It was first excavated in 1903 by Mirza Sher Muhammad, a well intended member of the staff compiling the Baluchistan Gazetteers. He recovered 59 vessels, all of which were turned over to Sir John Marshall who described them in an early Annual Report of the Archaeological Survey of India. In 1908, Colonel Claud Jacob excavated more


A stylistic zebu bull from Nal Period III

pottery at the site while he was commander of the Hazara Pioneers. One fifth of *ca.* 250 vessels he recovered went to the McMahon Museum in Quetta. This institution, and all or most of its collections,

was destroyed in the disastrous earthquake of 1935 (18). In 1923 or 1924 the Bazinjo Sardar of the region excavated more pottery vessels. They were broken in transport to Quetta. This lead Hargreaves to conduct his more systematic excavation of the mound in 1925 (40). He revealed a cultural horizon,


An elaborately decorated pot from Nal/Sohr Damb

whose pottery from the technical and aesthetical aspect belongs to the most remarkable productions of the early 3rd millennium BC. However, the context of the finds and the stratigraphy of the site remained unclear till recently.
He opened seven tranches at the site and recovered several fractional burials along with a trove of pottery.

Three complete burials in brick lined graves were found associated with architecture, one utilizing the boulders of a local riverbed and the other using large quarried stones from the neighboring hills, were noticed. The site also produced a fair number of copper implements. L a t e r digging found several objects of silver, described elsewhere in this book. Of great surprise was the discoveries that display close connections to northern Baluchistan, Mehrgarh, Mundigak in Afghanistan and Shahr-e Sokhta in southeastern Iran. Although chronologically disputed, this horizon is evidenced in Sohr Damb by 6-m thick cultural layers. The large-scale excavation has contributed to the dating of this important time and shown that the cultural landscape was more strongly diversified than hitherto assumed.

The site of Sohr Damb is known for its wealth of burials, prompting some to speculate that it was primarily a burial ground. Most of the burials are fractional but there are some complete ones also. For example, an infant's grave was found in a small chamber made by setting mud-bricks on edge, and the rave goods included 16 beads (apparently a necklace) and a crystal pendant. A complete burial of an adult showed a grave where the body lay east-west, set on the left side with the legs bent. There was no grave good here, just as there was no grave good in another infant burial. Complete burials without defined graves have also been recorded.

**A bull figure, Sohr Damb, Period III**

The miscellaneous cultural material recovered from the deposit forms an impressive list: copper adze, saw, chisel, knife, seal with a holed lug on the reverse, silver foil, carbonate of lead, lead slag, a celt made of quartzite, limestone weights, balls, grinding stones, marble ring stone and disc, bone disc and worked fragments, cattle figurines, and a large number of beads made of crystal, agate, carnelian, paste, and lapis lazuli. There was a copper adze.

Settlement of Sohr Damb is extremely important for its distinctive pottery - narrow-mouthed, ovoid form with disc base; narrow-mouthed carinated form with disc-base; almost straight-walled jars with disc base; disc-based open bowl; a carinated form with inward-turning upper body; and a flat-bottomed canister with round and straightedged mouth. With the use of red, blue or yellow pigment, the painted surface is poly- chrome and shows repetition of motifs by multiplying their outlines in many cases. Naturalistic representations of fish and ibex occur as motifs.

Sohr Damb has been subjected to reexcavations in recent years, which has established its occupational thickness to be 13 m. Period I has been related to the Togau ware phase of the Kalat sequence, which may put it in the early 4th millennium BC. Period II has yielded the classic Nal pottery. Period III has been related to DSIII phase of the Quetta valley and Rana Ghundai IIIc phase of northeastern Baluchistan. Period IV has been called a late phase of the Kulli culture of the Las Bela area. The sites which have traditionally been called Nal settlements in archaeological literature show a close association with two separate but inter-related irrigation devices. One was a system of reservoir dams where water was allowed to accumulate in a catch basin and slowly released to the fields, with dams being placed as weirs to divert water into canals leading to the cultivated areas. Another was the construction of *gabarbands* where walls were erected athwart the hill slopes so that the soil washed by the rains could accumulate behind them.

Period I (Togau phase) was discovered under the still undisturbed stone foundations of buildings of period II, which were uncovered during the excavations of 1925. There a cemetery with fractional, secondary burials came to light. The grave chambers contained up to sixteen individuals of all age groups as well as numerous grave goods, mainly pottery and beads made of semi-precious stones and shell. At that time the settlement exwhich is linked by features shared with the Harappan culture and the regional Kulli complex. After that the history of settlement of the mound as well as the entire region ceases for almost 1500 years. The reason for this discontinuation is a point of controversy. Palaeobotanical and palaeozoological studies in the area imply that the environment has not changed essentially. Abandonment and water shortage are, thus, unlikely factors, and a proposed shift in the course of the rivers can be ruled out as an explanation here, in contrast to the Indus valley proper.

The comprehensive and well stratified repertoire of finds recovered in Sohr Damb and Nal enables the first, precise circumscription of settlement horizons that represent human developments in Baluchistan from 4000 to 2000 BC. Current research in Nal has provided the grounds for a new interpretation of the cultural development in the region and their far-reaching relations. Of particular

importance is the recognition that many of the known culture complexes did not appear in succession, but were coexistent, and that the changes between the periods go beyond a gradual change.

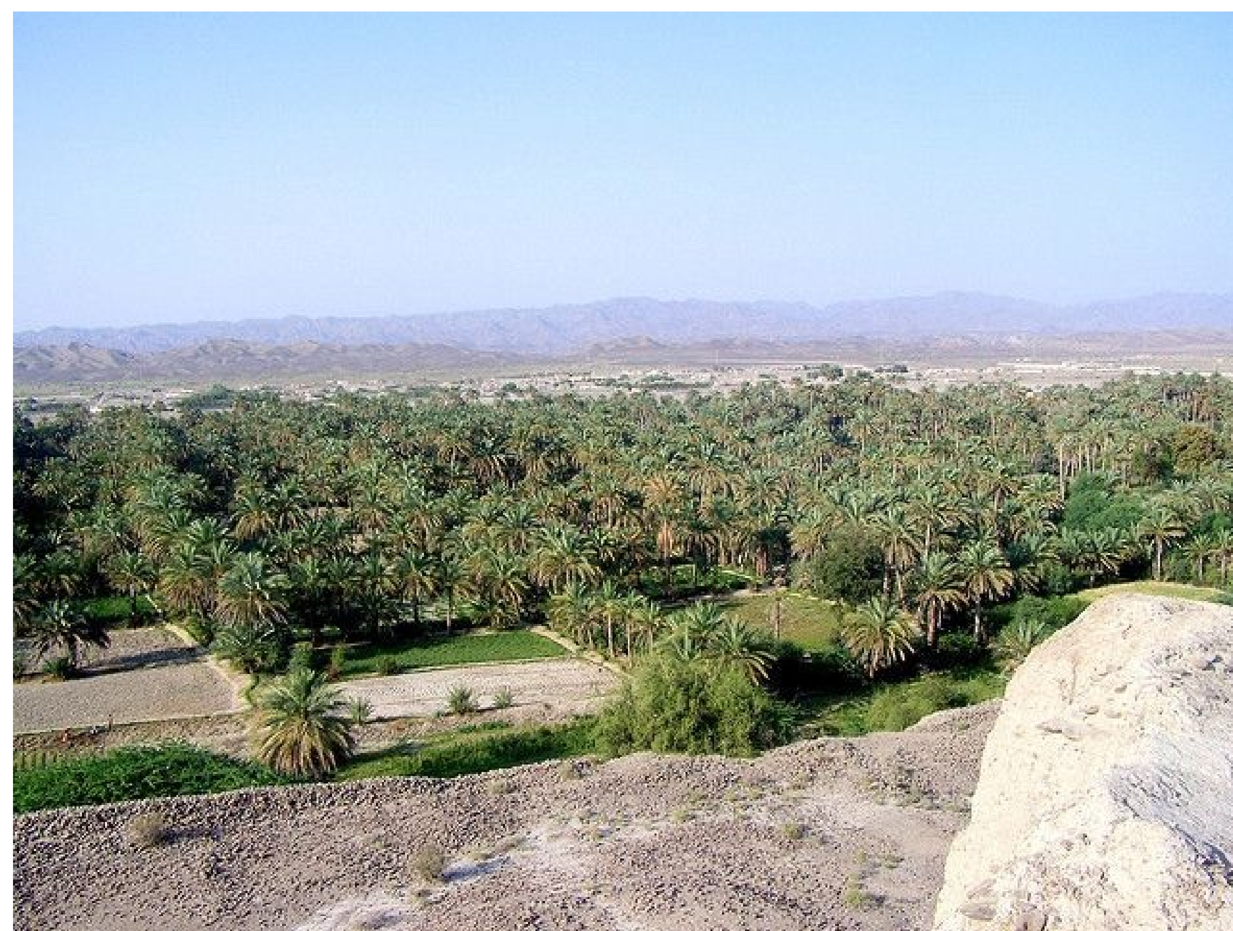
Turbat Oasis and Kej Valley: The Turbat oasis, far to the west of Las Bela plain and towards Irani Baluchistan, has been described in the following terms by Aurel Stein:

"...a narrow strip of fertile irrigated land, comprising a practically unbroken string of villages mostly small, stretches on both banks of the Kej river for a total distance of about seven miles! This

tended over the entire northern part of the tell, but it is superimposed by later cultural layers of more than 6 m in height.

With the beginning of period II the archi tecture, burial customs and many technological and stylistic features change. Now all of the de ceased are buried in single graves, and the number of grave goods decreases to a few ves sels. Rooms in the mudbrick houses are small and exhibit the typical signs of domestic activi ties, such as storage bins, numerous vessels, grinding stones, stone and bone implements, bull figurines and beads. Aside from the poly chrome 'luxury ware', Nal ceramics also com prises many kinds of domestic pottery.

In Period III there is a change in archi tecture, technology and stylistic features. Poly chrome painting and typical
longer appear. The houses
Nal vessels no
and rooms are



larger, typically with clay or plaster floors, gravel foundations, and wood used for foundations and roofs. All rooms still revealed an all-inclusive inventory, such as implements made of stone and bone, pottery, beads, figurines and also some copper seals. Kilns, misfirings, auxiliary means and casting crucibles show that the pottery was produced locally and that copper, perhaps also silver, were processed at the site.

The final period IV is severely eroded. It can be assigned to the Kulli-Harappa-horizon,

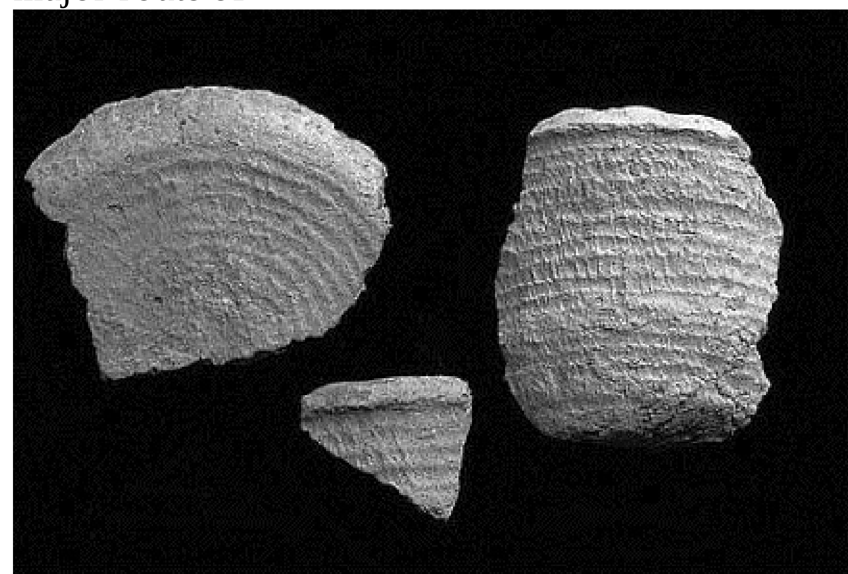
Turbat Oasis in the Kech Valley

oasis appears to have since early times formed an important, if not the chief, centre of population in Makran The oasis owes this importance not merely to its economic resources being greater than those of any other tract in Makran but perhaps equally also to its convenient central position on the great natural highway which the Kej valley provides through the country."

Shahi Tump and Miri Kalat are two most ¦important sites in this region.The interesting features of these sites are a distinct grey and richly painted (in black) pottery, associate with apparently extended burials. A common shape is an open flatbottomed bowl. In addition to the pottery, the grave Early Settlements!goods comprised a copper spearhead, a copper flat axe, a large number of stone beads, microlithic Kachi is a flat alluvial plain, an extension of the Indus Valley plains into an blades, etc. A large number of terracotta figurines of anomalous nick in the eastern edge of the Iranian plateau. It is thought that the humped bull is another distinctive feature. The elePleistocene Indus River flowed in this area, so that the alluvium is quite deep.ments of Shahi Tump burial assemblage appear in

but
it is more a

major route of



Basket-marked base and rim, Bakar Buthi,
Las Bela, Baluchistan

the Basket-marked base and rim, Bakar Buthi, Las Bela, **Basket-marked pottery sherd - base and rim - from**
Baluchistan
Bakar Buthi, Las Bela, Baluchistan. This technique of
the
Indus
and
making pots was originally used by the people of Mehrgarh *ca.* 6000 BC

Jarrige's excavations have confirmed that erosion by this river has removed a significant portion of the Mehrgarh site.
The Nari and the Mula River are other significant sources of water in Kachi.

Period II of Miri and the assemblage as a whole may be equated to Miri III A and partly to Miri III B.
Excavation at Mehrgarh began in 1974 under the leadership of J-P Jarrige andThe crops which have been identified in Miri Qalat continued into the 1980s, even later. The archaeological remains of differentexcavations are both naked and hulled barley, and

naked wheat *(Triticum durum/aestivum),* the barley periods are spread over 200 hectares of land on the banks of the river Bolan, andbeing more common of the two. Among the other different parts of the site bearing evidence of occupation in different periodscrops are lentil, pea *(Pisum sativum),* flax, sesame,

have been given separate numbers, such as MR1, MR2, MR3, etc.
coriander, and a variety of fruits including date palm and grapes.
The archeological story of this part of the Kachi plain does not end here. AnotherStein reports about the curious Shahi Tump is
taken
up
by

Gray Ware, associated with tall cups shaperd like
Nausharo, a site belonging to the Indus
civilization, and Pirak, which covers the transition to the Iron Age here.modern beer glasses, and rounded jars of the same
However, the present chapter is primarily concerned with the Mehrgarh Period I

coarse buff fabric. For years the chronology of Shahi Tump eluded our chronologicalk grasp, but and partly with the nature of the evidence up to Period III. According to Jarrige,the French reseacxh team working with the Italians in Makran has sorted this out (41). By and large,

millennium and the end of Period I, or the
beginning of Period II, is unlikely to be much later than c 6000 BC. It appears
Shahi uTmp ids of much greater interest to are

chaeologists studying the Bronze Age of Pakistan that by and large the Period II as a whole, inclusive of its phases a, b, and c, isand Iran, rather than the Neolithic period of the respread throughout the sixth and the first half of the fifth millennium BC. Thegion.

archaeological sequence listed in the associated Table 4.1 highlights the

The fire that partly destroyed a 4th millennium BC building at Shahi Tump is responsible for the exceptional preservation by carbonization of a net found on the burnt floor as a heap of entangled cords and knots. Macro- and microscopic observation allowed Besenvald et al. (54) to reconstruct the techniques used to manufacture the net from a twostrand plied cord. The comparison of the phytoliths extracted from the archaeological net to those from a modern reference collection suggests the use of fibers that originate from the leaves of a local palm species: the desert palm or *Nannorrhops ritchieana* (Griff.) This desert palm has been shown to be be extensively used in the arid regions of the Middle East for constructing ropes.

Mirti Kalat is also situated near Turbat. Margareta Tengberg did extensive work at this site. Large scale sampling (55) for plant remains at Miri Kalat indicates that agriculture based on naked wheat and naked and hulled barley was practiced between the 4th and the 2nd millennia BC. Other cultivated plants identified are lentil, pea, flax, grape and *Cori*coriander. The only summer crop, sesame, appears during the second half of the 3rd millennium. Edible fruits include dates, which may have been gathered rather than cultivated (55)

Southern Baluchistan: The major components of south Baluchistan are the Makran coast, the Makran Coastal Range which parallels the coast, the Kej valley which flows from the east to the west to the north of the ranges, and finally the two desert depressions of Hamun-i-Lora and Hamun-i-Mashkel continuing up to the Chagai hills which constitute the border between Baluchisan and the Helmand basin of both Irani and Afghan Seistan. The Hingol and Dasht carry the major drainage of Makran, with the Rakshan as another


Karachi valley: upper Winder

major river to its north. The annual rainfall may be marginal (only 3 inches, going up to 10 inches in the mountains) but when the snows melt and rain - whatever may be its quantity - happens to fall, agriculture is certainly possible in the valleys with the help of irrigation and some soil conservation. Kolwa trarck, Bela plain and Karachi Valley are also included in southern Baluchistan although they are culturally quite distinct from the Makran cultures.

SoutheasternBalochistanisgenerally characterized by narrow river valleys which only occasionally provide space for alluviation, and thus agriculture. The catchment areas are smaller and, due to the high gradient of the tributaries, the seasonal floods are often destructive and wash away the soil. In such a harsh and barren environment, irrigation through channels, qanats, or seasonal flooding is an essential prerequisite for settlement. It


Surface at Adam Buthi



thus developed early as an essential measure for the production of crops required by a growing population. The rising number of settlements from the beginning of settled life in the 6th millennium through the mid-third millennium BC witnesses the success of food production through farming and pastoralism. Pioneering archaeological fieldwork in this region was carried out by the great explorer Sir Aurel Stein, Har greaves, Fairservis, de Cardi, J.-M.Casal, G.Dales, and a couple of other explorers. In winter 1996-7, the Joint German-Pakistani Ar chaeological Mission to Kalat was founded to re open work in this area: it has done an excellent survey work, coupled with superb excavation at several sites.

During the 2nd millennium BC, the set tlements were aban doned and no human traces left. After a short intermezzo during the



historic period, the sites **A carnelian bead and a**

27. Shell- and bone fragments, carnelian bead and flint
flint drill from Adam
drill (Adam Buthi).

Stone architecture at Adam Buthi





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Coarse storage jar sherd with graffiti from Murda Sang

from the cultural, economic and political centers, and it appears that migratory pastoralism and a nomadic life-style was the only mode of subsistence and land use.

The earliest site, Adam Buthi, dates to the 4th millennium, but the early 3rd millennium BC was a period of growth in terms of number and size of settlements. Many sites appear to be associated

Stone blades from different layers at Adam Buthi

with dams. The pattern is very similar during the later 3rd millennium, but then occupation was either restricted to a small area of an earlier site, or sites were newly founded. This late Kulli occupation to which the largest number of sites in southern Baluchistan belong, co-existed with the Indus Civilization. The presence of quite a number of town-like settlements added a new and unexpected dimension to this cultural complex and to an area which so far had remained in the shadow of the Indus Civilization.



Stone architecture at Murda Sang


Typical pottery from Murda Sang

Adam Buthi was occupied around the mid4th millennium BC and abandoned around 3000 BC, well before the height of the Indus Civilization. It is a small (0.14 hectares), but high mound (7.5 meters). The sections revealed several phases of superimposed, well-built stone houses terraced along the slope of the mound. Pottery is not very abundant.

The vessels are partly hand made, but the slow wheel was also used. The shapes and the shiny red to violet slips resemble Kili Gul Mohammad pottery from northern Baluchistan, but, in general, the assemblage is a distinctive local production. The surface of the site is covered with several blades and flakes indicating an extensive silex industry.

Murda Sang is the largest prehistoric site in the Kanrach Valley. It was discovered in 1997 and trial trenched in 1998. The nucleus of the settlement


Polychrome Nal pottery from Niai Buthi



Another example of aNal-type polychrome pottery from Niai Buthi



Buff Nal type pottery from Niai Buthi

consists of houses grouped along lanes and streets. This central portion is about 6 ha large, but scattered occupation and a kiln area cover altogether *ca.* 35 ha. The eastern edge is eroded by the Kanrach River. Two dams were found to the north of the site and we assume that fields were located there. The site and the whole valley are overlooked by a fortification built on top of a terrace hill at the southern edge of the site.

The soundings revealed two main periods of occupation, the lower with three very compact building phases, the upper one with two. The ground was terraced with gravel and pottery before construction. The ground was terraced with gravel and pottery before construction. Houses have a stone

foundation, but mudbricks were also used, the roof was covered with mud-smeared reed. The pottery from the earlier occupation is very similar to that from the earlier levels of Balakot I. An AMS date run on charcoal suggests a dating into the very early third millennium BC. After 2700/2600 the site was abandoned.

Niai Buthi is the most impressive early 3rd millennium BC site in the plain of Las Bela. It is 13 hectares large and 13 meters high. Two trenches were opened in 1999. Virgin soil was not reached, but the levels exposed at plain level correspond to the last phase of occupation at Adam Buthi. In addition to purplish slipped unpainted pottery, Togau B and Kechi Beg pottery was found. During the early 3rd millennium BC. the site reached its maximum extension. Well-built stone and mud brick architecture was exposed in the sections and on the surface. In the east, several stone-lined hearths and dump pits containing animal bones and a large number of discarded and broken pots were excavated.

Apart from the typical buff Nal-pottery with black paint, fine orange and coarser household wares, polychrome vessels, partly still complete, were unearthed. A single Faiz-Mohammad Grey ware sherd and a chlorite fragment with an imbricate design are important finds since they provide cultural links to the north and the west. The pottery changes through the levels. Polychrome sherds are outlasted by monochrome Nal wares and in the upper layers of trench II carinated bowls with hammerhead rims and reddish-brownish slips foreshadow the later Kulli pottery. A typical motif is the singlebracket design which becomes a hallmark of the late 3rd millennium BC occupation.

Balakot, which is located in the southeastern Bela plain, was excavated between 1973 and 1976 by G.F.Dales. It is the only properly excavated site in the region. Despite its small size (ca. 4.5 hectares), the site is of crucial importance due to its long Early Harappan cultural sequence which is now dated to between 3100/3000 and 2600 BC. It is the southernmost find spot of Quetta- and Nalpottery, but has also many affinities to Amri in Lower Sindh.
Although the transition to the Harappan period is stratigraphically not very clear, there appears to be a gap. Despite some pottery forms which continue into the later third millennium BC, the classical Harappan pottery appears suddenly and fully fledged at the site. Kulli elements are also present, but not as pronounced as at Nindowari or the many Kulli sites found in the Kanrach, Hab- and Saruna Valleys.

Of the two periods of the site the upper one belongs to the Indus civilization whereas the lower one or Period I constitutes a separate culture called Balakotian. In this earlier period we find mud-brick houses (brick size 10 x 20 x 40 em or the ratio of 1:2:4) whose orientation is different from that of the Period II houses. Humped bull figurines, microlithic tools, beads of lapis lazuli, stone, shell and paste, a limited amount of copper and miscellaneous terracotta, shell and bone objects completed the other cultural details. Cattle, sheep, goat, buffalo, pig, hare, and deer of several varieties have been identified but not much use was made of the available sea food. The grains include six-row barley, vetch, legume and *ber* or *zyziphus*. The calibrated datebracket is between the late 5th millennium (*ca.* 4200 BC) and early 3rd millennium BC.

Most sites in northern and central Balochistan were abandoned around 2600 BC. This development is probably related to the expansion of the Indus Civilization. Southern Balochistan, however, continued to be inhabited by a people labelled "Kulli. This cultural complex is named after a site in Kolwa which was discovered by Aurel Stein. Since then, several other sites became known from Makran to southern Kalat, to Nausharo in the Kachi plain, and to the eastern foot of the Kirthar Range in

southwestern Sindh. Some motifs and vessel shapes found in southeastern Iran and on the Arabian Peninsula, are sometimes also linked to the Kulli and seen as indications for long-distance contacts

The Kolwa tract lies to the northwest of Bela and was known for its production of large quantities of grain, which used to be exported to the neighboring areas. The main site of Kolwa is Kulli which has given its name to a culture with a distinct pottery type associated with it. A second major site of this culture that from the earlier levels of Balakot.

Several Kulli sites were discovered in the survey conducted by a German team. As a matter of fact, this phase coincided with the maximum number of settlements. The large number of settlements along with the developed plan and large size of a couple of sites, in particular in the Hab- Saruna Valley, added a new and unexpected dimension to this. Many of these sites are located in strategic positions, on top of mountains or terrace hills, overlooking the valleys and controlling the plains and passes. Other sites are small hamlets built in the open plain. Although they have no defenses, they are of a very compact appearance. Most sites are associated with dams. complex. The layout of some



Orange-red “Nal” beaker with typical pattern from Niai Buthi


Faiz Muhammad Gray ware bowl from Niai Buthi, a surface find

sites resemble the plan of Harappan sites: Rows of houses are built along lanes and streets, which are sometimes paved. Sometimes, stairs provide access to upper terraces. Building materials were large ashlars or boulders, and the houses are often preserved to a considerable height

Mehi is another important site, located in the Mushki valley to the northwest of Kolwa. Both at Kulli and Mehi only the upper levels were exposed. Kulli, a 12 ha site, showed multi roomed stone structures, the blocks of the shale stone being brought from about 3-4 km away. There were large stone querns and rubbing stones, beads of black stone, lapis lazuli, agate and carnelian, curved bone bangles and a limited amount of copper, gold, and glass. Pottery is elaborately decorated and diverse both in shape and color, one of its diagnostic features being an elongated cattle form with large and round eyes. It is almost invariably shown in framed landscapes. Among other things, Mehi (10 ha) has yielded the evidence of cremation and the subsequent burial of ashes, bones in a pot in one case, and simply covered by earth in another.

At Niai Buthi in Bela there are two phases of the Kulli culture, the upper phase being dated by radiocarbon in the late 3rd millennium BC. The site is about 13 ha in extent and about 13 m high, which makes it a very impressive site. The earliest level so far reached shows well built mud and stone architecture, stone-lined hearths, and a substantial quantity of Nal pottery. Well-built stone houses were found terraced along the slopes of the mound. The pottery was handmade, with some evidence of the use of slow wheel. At Nindowari (45 ha) there is a central, stepped structural complex which used stone blocks weighing up to 1 ton each. Associated with this is an assemblage of typical Kulli pottery, terracotta mother goddess figurines with applique decorations, painted bull figurines, and two Indus civilization seals. The calibrated date is *ca.* mid-3rd millennium BC. Edith Shahr (29 ha) shows a matrix of large river boulders set in mud and small stones. There is a series of stepped platforms with the association of typical Kulli pottery and mother goddess figurines. Edith Shahr which lies to the north of Bela has been associated with the upper phase of Niai Buthi. Las Bela has a

known source of copper and one will not be surprised if the sites mentioned here reflect the wealth generated by mining and metallurgy in this region.

Kirthar Piedmont and Sind Kohistan: It is a distinct geographical area, with the Kirthar rampart paralleled on the east by the Lakhi range and outliers and bordered on the east and southeast by Kohistan where low, parallel ridges define wide open valleys with thermal springs and rivers. One of the well known sites of this geographical sector, Amri, is located at the edge of the cultivated alluvium within a mile of the right bank of the Indus, but most of the related sites are located around thermal springs and take advantage of the water coming down the innumerable minor watercourses of the region. Good agricultural soils are, however, said to be limited, but large grazing areas and plentiful year-round supply of water make it suitable for large-scale pastoralism as well. Period I at Amri is divided into four phases on the basis of ceramic changes, but the basic character of 'Amri ware' -a handmade red-beige pottery with geometrical designs painted with a thick brush in black - often with red fillings - remains the same, although with an increasing proportion of wheel-made specimens. Potter's graffiti are common. The general artifactual assemblage does not extend beyond a little copper, shell and terracotta bangles, sling stone, and parallel-sided blades. Mud-brick houses occur, but along with them there are traces of 25 cellular mudbrick formations, possibly meant to support superstructures. Cattle, sheep, goat, and donkey have been found. Deer account for the wild fauna. It has been inferred that a trench at the western edge of the Amri IA settlement was perhaps a canal. After an 'intermediate' period, this period was followed at the site by the Harappan Civilization.

The Amri pattern Ghazi Shah which has beads of copper, lapis, shell, etc. and chert drills to make the stone beads. A distinguishing feature of the sites in Kohistan is 'an artificially-built conicallyshaped hill', rising up to 25 m above the level of the surrounding plain. The calibrated range of Ghazi Shah dates is *ca*. 3400-2800 BC and thus the beginning of Amri-type occupation may safely be put around the middle of the 4th millennium BC. An important feature of the sites in Sind Kohistan and the Kirthar Piedmont is that many of them display signs of an irrigation system, with some sites providing structural remains of stone ridges that outlined agricultural fields.

Neolithic and post-Neolithic Sites in the Indus Plains: Within the geographical sphere of the Indus river system there developed early farming settlements that are chronologically pre-Harappan but largely post-Neolithic. Although characterized by regional diversity, these were the habitations of the direct cultural predecessors of the Harappan Civilization that emerged by the early third millennium BC throughput the Indus Valley. While these settlements have had cultural ties with the neolithic communities of Baluchistan and the Iranian plateau, their ecological setting was obviously distinctive. The villages of the Indus system were affected by the changing courses of the Indus floodplain and the thick alluvial soil that yielded rich harvests without the need for irrigation because of annual inundations. In the period of pre-Harappan village life the banks of the Indus river and its tributaries were lined with dense gallery forests that supported animal populations extending into the grasslands beyond the watercourses. With ample sources of game and a superb soil for cultivation of plants, these post-Neolithic villagers enjoyed a somewhat less stressful environment than their neolithic contemporaries to the west of the Indus, although unstable river courses meant periods of flooding and occupation resettlement. Kot Diji and Amri are two type sites but there are many more. These have been described elsewhere in detail.

Mountaneous Rim in the Northwest - The Bannu Basin and the Gomal plain: The Bannu basin is a topographically delineated region situated at a point where the lowland of the Indus plains abuts the

highlands of the Pashtun country and Afghanistan. The basin is climatically marginal for rain-fed agriculture but two perennial rivers, the Kurram and the Tochi, flow through it, and most of the modern and almost all of the known ancient settlements are situated close to where these rivers flow onto the alluvial plain. The current vegetation is has been repeated at

yielded potter's graffiti, much degraded but there is no clear evidence of climatic change over the past few millennia. Irrigation is practiced along the river courses but dry farming areas depend more on pastoralism than on agriculture.

From the 1970s onwards, increasingly focused archaeological research has been conducted in the region, and the Bannu Archaeological Project has conducted surveys and excavations there, largely focusing its attention on the Neolithic site of Sheri Khan Tarakai. This work has shown that in the Bannu region there were two distinctive cultural phases before the so-called Kot Diji Phase. The existence of one or other of these two phases has been confirmed by investigation of a number of other late prehistoric sites in the region that have comparable cultural material, including Girdai, Ter Kala Dheri, Lewan, and Islam Chowki.

Of all the sites excavated in the region, Sheri Khan Tarakai (21 ha), located on the bank of a non-perennial stream of the Tochi system, is the most important, both because of its antiquity and the clearly documented details of cultural remains. The calibrated date range is *ca.* 4500-3000 BC. Mud brick houses on stone or boulder foundations were common along with an impressive set of saddle querns and mullers, ring stones, ground celts, microlithic industry, bone tools, occasionally painted terracotta bull and female figurines, terra cotta spindle-whorls, cultivation of barley, use of sheep, goat, cattle and buffalo, freshwater gastropods suggesting possibly a greater reliability of water source in the past, chank shells of the Indian ocean variety *(Turbinella pyrum),* and two major categories of painted pottery. One of these is coarse handmade with a thick black-slipped exterior and a burnished pinkish buff to cream-slipped interior with black or brownish painted designs which include standing caprids. The external surface of the second type is roughened with an applied thick slurry of clay, al- though the neck and the shoulder may be unroughened and decorated. Interestingly, metal is absent in this level which is thus considered 'neolithic'. The half-perforated but abundant terra- cotta cones from the site are supposed to have parallels with sites in Turkmenistan. The human terracottas are stylized and occasionally painted but do not conform to the Baluchi tradition.

The 3rd millennium BC levels in Bannu are associated with the Kot Diji culture of the plains and have been excavated at Tarakai Qila, Lewan, Islam Chowki, and Lake Largai, all in the Tochi and her tributary system. At Tarakai Qila mud-brick architecture with massive walls in places has been found along with wheat, barley, lentil, and field-pea, whereas at Lewan there is only a series of excavated pits without any clear architectural association. But otherwise Lewan gives the impression of being a production site of stone objects like querns, mulIers, ground stone artifacts, etc. Islam Chowki is interesting in the sense that there is evidence of a damaging flood during its prehistoric occupation which has among other things sheep, goat, cattle, ass, wheat, and barley. Lake Largai had, in addition, bones of rhinoceros.

On the whole, the Bannu basin offers an uninterrupted sequence of village occupations right from the middle of the 5th millennium BC. However, this sequence seems to be somewhat isolated and does not convincingly relate to anything in Baluchistan, although some have claimed that the Bannu basin material was closely related to northeast Baluchistan. This is perhaps not surprising in the sense that

Bannu along with the neighboring area of Kohat are somewhat isolated areas, and if anything, their traditional links have been more with Afghanistan than the Punjab plains. A number of substantive conclusions have been drawn concerning the cultural assemblages from these sites and their broader significance. They are as follows: 1. There are clear parallels between the cultural sequences in the Bannu Basin and the Gomal Plain during the fourth and earlier third millennium BC, but this does not continue into the mid-late third millennium BC;
2. During the fourth and early third millennium BC, the cultural sequence of the Bannu and Gomal regions follows a different trajectory to the main stream of cultural development in the Indus Valley,
3. The developments that took place during the fourth and early third millennium BC in these areas to the west of the Indus may well have had an influence on areas of the Punjab and adjacent areas to the east and/or south.

Unlike the Bannu basin, Gomal Valley became a center of attention quite early one. This interest probably arose due to its topographic configuration. Like the Kachi plain, the Gomal valley (*ca.* 90 x 60 km) juts out of the Indus alluvium towards northeast Baluchistan and Afghanistan. Essentially a dry, featureless plain, its main importance lies in being a major communication route between Derajat (that is, the Dera Ghazi Khan-Dera Ismail Khan area) and Afghanistan. Our knowledge of the Gomal region primarily comes from excavations at the sites of Gumla and Rehman Dheri in the northern part of the plain although in 1997 members of the Department of Archaeology, University of Peshawar, discovered a low mound in the southern part of the Gomal Plain, which has since been referred to as Jhandi Babar.

The programs of excavation and survey that have thus far been conducted on late prehistoric sites in the Bannu Basin and the Gomal Plain have provided the first clear perspective on fourth and early third millennium BC village-based occupation in the areas of northwest tregion of Pakistan that lies to the north of Baluchistan. The late prehistoric cultural sequence for the Bannu region as it has now been reconstructed envisages three partially overlapping phases that appear to be paralleled in the Gomal Plain during the fourth and early third millennium BC. From earliest to latest, these have been referred to as the ‘Sheri Khan Tarakai Phase’ (*ca.* 4300-4000 to 3000-2400 BC), the ‘Tochi- Gomal Phase’ (*ca*. 3000 - 2400 BC) and the ‘Kot Diji Phase’ (*ca.* 2900 - 1600 BC). However, from the mid to late third millennium BC, marked differences in the cultural sequences of the two regions first become apparent.

Gumla is a small site (a little more than 1 acre). Period I is aceramic and shows microliths, domesticated cattle bone, and large shallow pits used for cooking or roasting. Period II has a wide range of wheel-made pottery (some with 'Quetta ware' designs and some with Kot Diji forms), microlithic tools, a limited amount of copper-bronze and terracotta bangles, gamesmen, toy carts, and cattle and female figurines (one type with a stylized lower body and the other in a seated posture with the legs stretched out in front but bent slightly at the knees). Period III is dominated by Kot Diji pottery forms and designs and the appearance of a new terracotta female figurine style (flat triangular lower portion stretched-out in front) but otherwise there is continuity of occupation. Period IV belongs to the Harappan Civilization.

Rehman Dheri, another site, is a much larger one (more than 20 ha) in an area with less than 10 inches of annual rainfall, where 'barani dagar' method of irrigation (the water is allowed to accumulate in the fields by banking the lower sides, and when they are dry, ploughing and sowing are done, taking care to level the field by a wooden plank to seal its capillary line and thus keep the moisture inside) is

practiced. Although periodization has been offered on the basis of the changes in pottery designs and styles, basically it is a Kot Diji culture site, showing an increasing number of Kot Diji pottery forms and designs culminating in some Indus civilization examples. Otherwise, the site is fortified right from the beginning, with a 4 ft wide mud and mud-brick wall resting on a 6 ft wide foundation wall of the same material. Wheat, barley, fish, and domes- ticated cattle, sheep, and goat complement the picture, but two interesting features of the site are the occurrence of an ivory seal (two stags on one side, and a scorpion and a frog on the other side) right in the beginning and the wide occurrence of graffiti engraved either on the bases or at the rims of pots from the middle phase onwards. The calibrated date range of Reh- man Dheri is c.3400- 2100 Be. The Kot Diji culture belongs to the plains, and the fact that a fortified Kot Diji settlement was put up in this area as early as ca.3400 BC throws light on the significance of the Gomal valley as early as that period.

The Ghaggar-Hakra Plain (Jalilpur): The proposition that the flow of the Indus on the west was matched by a parallel and equally significant but now extinct river on the east is being trumpeted since the days of Oldham, a Geological Survey of India geologist, since 1870s. Several other scholars, most of them of Indian origin and generally showing ultra-nationalistic or Hindutva credentials, also strived to show that this 'lost' river represented the Sarasvati of the Vedic fame. The literature on this theme has swelled disproportionately, for the most part in the Indian expatriate circles. This "Sarasota" River dried up almost completely soon after the end of the Harappan Civilization and that the archaeology of the Harappan Civilization is closely tied up with the life and death of this sacred river. There is, indeed indications that such a river, of which remnants are the Ghaggar-Hakra channels in today's Bhawalpur in Pakistan, did in fact exist and that it did dry up at some point in time. Why and when the Ghaggar-Hakra flow dried up cannot be determined; at some stage of its history, its headwaters must have been subject to serious loss of water. Whether this was due to denudation and erosion or to the assumed shifting of the Sutlej and the Yamuna to their present channels from their previous links with the Ghaggar, we do not definitely know. This entire debate, however, seems to be pointless as there is no archaeological or hydrological evidence to show that this river system was ever as majestic as it is purported to be.

There are number of pre-Indus and Early Indus sites in this region, of which 'Hakra-ware' sites are related to late Neolithic or mature agricultural settlements. The Hakra ware is basically a thick and under-fired hand-made pottery whose main form is a globular jar with a thick application of a slightly liquid mud paste mixed with broken bits of sherds.

Jalilpur is a Neolithic site that lies 65 km southwest of Harappa on the left bank of the Ravi river at its junction with the Chenab in the western Punjab. Excavated in 1971, the first occupation level revealed stone and bone tools like those from the Period I at Sarai Khola. Mud brick structures may have been built. There is a distinctive handmade red pottery in deposits with bones of cattle, sheep, goat, and gazelle. Net sinkers suggest active fishing practices. This site was occupied by people who shared cultural features of the Harap- pan culture, as seen in the contents of Jalilpur II deposits. These villages reveal a way of life where a mixed economy of hunting, fishing, pastoralism, and some agriculture formed the foundations of the cultures immediately before or during the early phases of the Harappan Civilization.

The Pothwar Plateau: The only relevant excavated site in this region is Sarai Khola which is a double mound site near Taxila on the Potwar plateau, the northernmost extent of the Indus plain. One of the two mounds had washed away at the time of first excavations in 1968-71. The intact mound

revealed a Neolithic occupation at the base of four cultural horizons. The Period I has ground stone celts, terracotta wheels and toy cart frames, microlithic tools, bone points, a handmade pottery with basketry impressed base, and no metal. The transition to Period II was gradual, handmade pottery being replaced by wheel-made types. A major type of this kind was a red jar with short neck and large elliptical/ovoid body, and painted at the neck and shoulder by black paint. This is a typical 'Kot Diji' form; more examples of Kot Diji ceramic parallels have been found in this period, along with some copper, terracotta and shell bangles, microlithic and ground stone artifacts, terracotta cattle figurines, toy cart frames, sling pellets, stone beads, etc. There is no radiocarbon date but Period II should belong to the second half of the third millennium BC.

Sarai Khola enjoyed a long period of occupancy. Radiocarbon dates for the Neolithic period I fall around 2715 B.C. to 2550 BC. B.C. Which are obviously of much later times than those from Mehrgarh and Kili Gul Muhammad. The dates are more in line with the so-called ‘Northern Neolithic” and a majority of Neolithic sites in East Punjab and Gujarat (India) in general. Sarai Khola clearly represents a tradition quite distinct from that of contemporary Sindh, Baluchistan, and Cholistan with ground stone axes and plain burnished brown pottery, similar to thatt at Burzahom in Kashmir where deep pit dwellings are associated with grey stone axes, bone tools, and grey burnished pottery. The evidence of the aceramic neolithic stage is reported at Gufkral, another site in the Kashmir region, which has been dated by radiocarbon to the 3rd millennium and later. This ‘northern Neolithic culture’ has already been described elsewhere in this volume.

Evidencesofinterlinkingsamongthe sites: Around 4000 BC pottery in the different sites of Baluchistan showed remarkable homogeniety in their nature and design barring a few regional peculiarities. So much so that the distinction between Kili Gul Mohammad' and 'Togau' styles of painting has now no justification. Kalat, Quetta, Zhob and Loralai potteries are also one with those found at Mehrgarh even though the sites which have yielded them are located in the highland. Contemporary to that, townships also developed along banks of the Indus and its tributaries. The developed form of Kili GulMohammad/Togau painted pottery, which is also found at Mehrgarh was found at the lowest levels of these settlements, a fact which clearly shows that the highlanders came down to the lowlands and established the first settlements in the river valleys around 4000 BC or the plains people quickly learnt the art of agriculture, sedentary living and the manufacturing of pots through adaptation and cultural diffusion.

The Kachi plain, it may be remembered, is an extension of the Indus alluvium, and no agriculture is possible in this area of scanty rainfall without first flooding the fields by throwing check dams across the local watercourses. If the kind of agricultural transition that we have seen at Mehrgarh was possible in the Kachi plain, that must have been possible in many other adjacent areas. Second, the way in which different Baluchi valleys passed on to a full-fledged stage of wheat-barley agriculture and the herding of cattle, sheep, and goats seems to vary from area to area, with each of the valleys following apparently different, although inter-related, paths. For instance, the onset of the painted pottery tradition at Rana Ghundai in north-east Baluchistan is marked by a strong affinity with the painted pottery tradition of the sites of Hissar in northeast Iran and Sialk in western Iran. Ibex of the Iranian pottery was no doubt re-placed by cattle at Rana Ghundai, suggesting a period of adaptation in this region but the very fact that the pottery shapes of Sialk and Hissar kept their identity intact in Rana Gundai II is striking and may indicate an unexplored level of contact between northeast Baluchistan and the northern and western rims of the Iranian plateau. The Kachi plain was indisputably an original center of barley, sheep, goat, and cattle cultivation, but this does not necessarily mean that it was adrift

from what was happening elsewhere in the interaction zone between the Oxus and the Indus and that the Kachi plain alone was such a center in Baluchistan.

During the early part of the fourth millennium extensive trade relationships were established, whereby the geographically isolated sites like those in the highlands of Baluchistan, the basins of the Indus and the Ghaggar-Hakra river system got integrated forming a vast network. It became the 'Formative Period' of the Developed Urban Phase of the Indus Civilization of the third millennium BC since the roots of this civilization are found firmly established in the Neolithic and Chalcolithic village cultures which had moved from the foothills of Baluchistan into the plains at Amri, Jalilpur, Harappa, and at several Hakra Culture sites in the Bahawalpur region. The final levels of Mehrgarh gradually gets merged with the Kot Diji culture complex forming the Early Harappan cultures.

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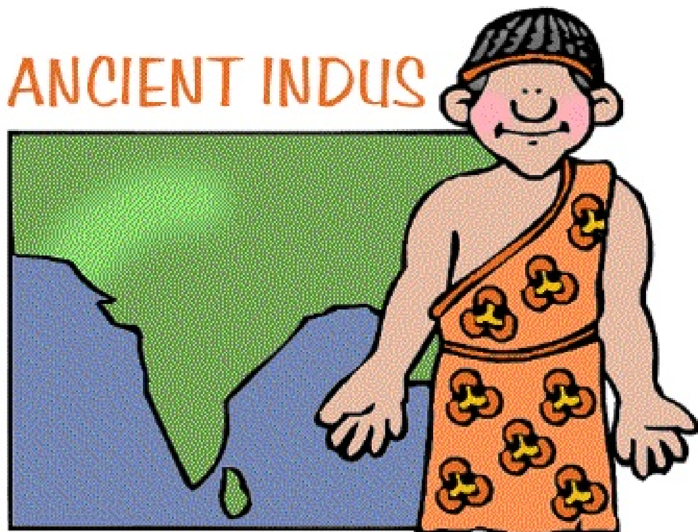
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VII

SECTION VI

In Search of Cultural Sequence

VI.0. In Search of Cultural Sequence



The story of the development of agriculture and settled life in Baluchistan and the rest of Pakistan is not linear. It is a story that has some wide and unexplained gaps. Furthermore, it is a story of different and

somewhat divergent geographical areas wherein the cultural developments happened unevenly and at different chronological times. Because of these limitations, the story cannot be told in a smooth, linear fashion.

The development and evolution of cultures in South Asia, including the Indus or Harappan Civilization, has been extensively written about. Unfortunately, however, there is no consistent and uniform chronological sequence in use for this time period, although several models and schematics have been offered from time to time in the past. Some of these are more popular than the others, depending on what area one is looking at preferentially or how wide once vista is stretched to. Basically, two approaches have traditionally been taken. The first approach deals with different geographical or cultural areas on their own merits. This approach has been taken by most of the archaeologists working in South Asia. Walter Fairservis, D.K. Chakarbarti, H.D.Sankalia, Bridget and Raymond Allchins and many others, all have taken this route to explore the early settlements in Baluchistan and the spread of Neolithic culture, along with the spread of agriculture, in the Indus plains.

The second approach tries to put some order in these developments and group the archaeological data on the basis of chronological order rather than on geographical boundaries. This approach tries to tell the story of settlement of the Indus Valley as a whole, considering the narrative as a cultural and technological continuum. A number of archaeologists have taken this approach, among them perhaps Gregory Possehl is the most prominent.

The first chapter of this Section examines these proposals and recommend one that would, in author's view, yields the optimum results. The rest of the Section then explores different regional cultures of the Indus Valley between the onset of the Neolithic *ca.* 7000 BC and the beginning of the Harappan Civilization *ca.* 2500 BC under the proposed periodization. The pre-urban cultural sequence, which is ultimately the result of the cultural periodization under discussion, should, however, be considered just an aid in the study of the Indus Age rather than a framework for the chronology of events. After all, as Bridgette and Raymond Allchin said: a system can all too easily can become a tyranny instead of an aid to understanding.

In this Section we shall generally take Possehl's lead and see if we can arrange the Neolithic and post-Neolithic developments in Baluchistan and the rest of Pakistan in some sort of cultural sequence. This is, however, not a simple task as the sequencing of cultural development or the periodization of archaeological data in terms of common cultural traditions ranks among the more elusive tasks of historical scholarship.

The identification of coherent periods of history and their chronological relationships with each other involves much more than the simple discovery of self-evident turning points in the past: it depends on prior decisions about the issues and processes that are most important for the shaping of human societies, and it requires the establishment of criteria or principles that enable historians to sort through masses of information and recognize patterns of continuity and change. Even within the framework of a single society, changes in perspective can call the coherence of conventionally recognized periods into question (1).

For the purpose of this book, we are faced with the description of cultural change in terms of pre-Neolithic (Late Paleolithic, Epipaleolithic, or Mesolithic), early Agriculture (the Neolithic), mature village farming societies, and the Early Harappan (pre-urban societies). To what extent is it possible to recognize these stages and to what extent is it possible to identify the meaning and coherence across the boundary lines of societies and cultural regions? What criteria or principles we might use to sort out patterns of continuity and change and to distinguish such periods or phases? Especially,

how do we handle a cultural region where a large number of 'cultures' existed contemporarily with frequently converging trajectories but occasionally also with diverging paths? The prehistory of Pakistan, especially between the early Holocene and the beginning of urbanization in the Indus Valley, is a primary example of such a situation

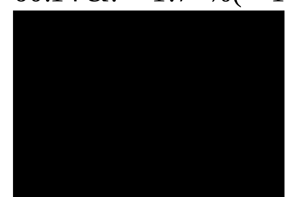
In spite of these types of conceptual difficulties, the archaeological dilemma and unanswered questions, efforts at regional or country-wise periodization might profit by examining participation of the various peoples in processes transcending individual societies and cultural regions or sub-regions. From remote times to the present, cross-cultural interactions have had significant, social, economic, and cultural ramifications for all peoples involved. Thus it stands to reason that prehistoric cultural stages of diverse regions might have some common values for purpose of visualizing the trajectories of the respective 'cultures'. If nothing else, it might make the study of cultural change within a specified region and specified time bracket easier to understand.

This section examines the same data that has already been studied in the previous pages. Thus, a certain degree of repetition is unavoidable and the reader may be required to refer to Chapter V.6. again and again. In a way, this Section is largely an attempt to satisfy the hidden desire for reading the prehistory of this land in a 'linear' fashion, if at all possible.

VI.1. Periodization and Cultural Sequence - A Review of the Past Proposals

The periodization "#!$%$&'(!)*+!*,,!&--! and sequencing of '*$.,%!/')-('!*!&%0*++%! regional cultures is .+$&'*1!-2!*+!*.1!&-! not particularly a

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pry. It seems that every author who ! has extensively dealt with the archaeological data pertaining to this part of the subcontinent implicitly assumes certain model of categorization and periodization without much thought to its general applicability, or explicitly proposes his or her own scheme without any rigorous analysis of the model proposed. These models then seep through the review literature and become the part of various textbooks. The result is that there is no entirely satisfactory chronology for the pre-urban Indus cultures, nor is there a generally accepted scheme for ordering the cultural changes in various regions in relation to their chronological bearings. This situation is particularly vexing in view of the fact that a lot of archaeological data is available on the Neolithic and the Early Harappan cultures, that the various archaeological 'cultures' can be satisfactorily defined in terms of chronological boundaries, and that these constructs can be easily arranged. The result is that the prehistory of this region is being written in the form of free-flowing essays - nice to read but not easy to comprehend. This segment of Pakistan's prehistory,

which we have called here *A Prelude to Civilization*, is a dynamic time period indeed. The chronology may not be as perfect as historians would like to have, but is good enough. There are uncertainties here and there and there may be some confusion in archaeological data or their

interpretations but these are not insurmountable hurdles in the way of understanding the flow of history generally. Indeed, several prehistorians and archaeologists have taken advantage of these strengths and have tried to read the prehistory of the “north-western India” as a continuum and have tried to put some semblance of order in the archaeological data so that it becomes a comprehensible narrative. In this chapter we shall discuss these efforts in brief but focus our attention on one compromise model through which we shall proceed to look at our archaeological data in the forthcoming chapters of this Section.

Cultural History and Chronology: At its largest extent, the Neolithic and the post-Neolithic Greater Indus Valley incorporated a variety of regional cultures throughout Pakistan, parts of eastern Afghanistan and a small sliver of adjoining India. These regional cultures, although distinct archaeologically, all interacted in a manner as to fashion an integrated cultural tradition covering a large area and eventually evolving into a culturally unified urban civilization that lasted for almost half a millennium before going into oblivion. This process practically started from the very onset of the Holocene, the early evidence of which we have from Sindh Epi-paleolithic settlements of Sindh but more so from eastern Baluchistan in the form of Mehrgarh and other early Neolithic settlements of Baluchistan.

The culmination of this formative process was a number of localized archaeological traditions that became so evident in the archaeological record of the fourth millennium BC. As described in Chapter V.6., the recorded sites now extended from the foothills of the Himalayas to the Indo-Iranian border on the coast of Makran, from the foothills of the Sulaiman Mountain Range to the edge of the Thar Desert, and from the Valley of Kashmir to the shores of the Arabian Sea. A substantial part of Afghanistan and probably some of Turkmenia also took part in this hesitant move to civilization. The excavations at Mehrgarh, Kili Gul Muhammad, Gumla, and several other neolithic sites have provided evidence of cultural sequences stretching from the aceramic Neolithic, *ca.* 7000 BC. to a large number of sites in Baluchistan and Sindh ca. 4000 BC. Even a larger number of sites representing mature farming villages, such as that at the lower strata at Harappa, Amri, Kot Diji, Sibri, Nausharo, and several other sites of that age, afford us a picture that depicts the scene just before the beginning of the urbanization. This is a period of long duration - some five thousand years long and quite varied in scope.

Early researchers have tried to incorporate the chronologies of these developments within their archaeological and historical frameworks but these chronologies are not always congruent. For example, even within a single volume of archaeological chronologies published in 1992 two opposing and contradictory chronologies were included - one by Possehl and Rissman (2) and one by Shaffer (3). This inherent weakness of the archaeology of the Indus Valley has been a point of contention in the study of prehistory of South Asia as a whole. This has also provided an excuse for not examining the chronological sequence of Pakistan with any degree of seriousness.

The development of agriculture and sedentary living in Baluchistan has been traditionally considered as a singular and abrupt event of diffusion of the Neolithic culture from the west, and most chronologies perpetuated the concept of linear cultural development traveling from the West to the East. Even the extensive digging at Mehrgarh did not change this mindset although the drama of some seed-bearing people coming from the West and teaching the ‘natives’ the art of agriculture and sedentary living, was relegated to the backstage to be reenacted at appropriate times. Such approaches were rooted in the culture-historical approaches of the early and mid-twentieth century, and

intertwined neatly with the Indo-Aryan invasions or simply with a Euro-centric point of view of the academic community of the time. However, as more and more data started to accumulate, it became clear that this huge geographical and temporal expanse requires a flexible and dynamic chronological framework in order to understand them.

Culture-Historical Approaches: There appears to be a general consensus that the Neolithic occupations at Mehrgarh represent the earliest cultural and technological developments within the Greater Indus Valley, and that they demonstrate continuity with later urban sites on the Indus floodplain. Part of this realization lay in the reaction to the Wheeler-Piggott paradigm in which the earlier agricultural communities of Baluchistan were di

A Coarse Classification of Humans History nomadic life of hunters and gatherers but had started to experiment with the domestication of plants and animals. Anthropologists call it the Mesolithic and some prefer to call it Epi-paleolithic. Chronologically, we are not certain as to when this transition period started and when it indeed ended. All we know is that it was a time period between the Upper Paleolithic and the Neolithic. Because of these uncertainties, especially in context with Pakistan, it is better to view these two stages, the Neolithic and the Mesolithic, as one continuum. This transitionary stage of human development, as it applies to ancient Pakistan, cannot be before 15,000 BC and not later than 10,000 BC, although some isolated areas could have defied this general chronology. We have then:

1. The Epi-paleolithic (mesolithic) stage
2. The Neolithic stage
a. Aceramic
b. Ceramic
3. The Chalcolithic stage
4. The Bronze Age
5. The Iron Age

This classification and periodization is basically a technological approach wherein the presence or absence of metals for the manufacturing of tools and implements play a dominant role. This approach is the conception of some sort of a cultural ladder that represents the progression of human race from a Neolithic beginning to the Iron Age through a distinct intermediary stage of the Bronze Age.

Paleolithic
Epi-Paleolithic/ Mesolithic Neolithic
“Chalcolithic”
Bronze Age
Iron Age

From the ‘beginning” to 15,000 BC
20,000-15,000 to 10,000 BC
8,000-10,000 to 4,000 BC
Nominally between 4,000 and 2,500 BC
2,500 to 1,000 BC
800-1000 BC till present The *Neolithic* period occupies a special position in this classification of the prehistory of man. It is during this time period that man started to produce his food instead of gathering it from the wild. He also started to domesticate animals for his use instead of hunting them

in the open. It is at this stage that the man started to live in small clusters of fixed dwellings, which he fashioned from the naturally available building materials. We may call these vorced from the later urbanization witnessed within the Greater Indus Valley. On a technological level, archaeologists and anthropologists also spoke about *Chalcolithic , a* period that followed the *Neolithic*. During this time, the Indus man had acquired some knowledge of metals, especially copper and bronze, but still largely depended on stone tools. This stage then led to the *Bronze Age* and further on to the *Iron Age*. The Harappan Civilization belonged to the Bronze Age while the Iron Age is the one we are presently passing through. In the context of ancient Pakistan, the Chalcolithic is very much a murky area of prehistory but of extreme importance to the prehistory of India where it lingered on for several millennia.

The Neolithic was preceded by a brief transition period when man's tools had become quite sophisticated and complex. He was still leading a clusters of huts 'earliest settlements', although they may not be indeed the 'earliest'.

The Neolithic is often divided into two stages: aceramic and ceramic, i.e., without pottery and with potterey, respectively. The ceramic followed the aceramic in chronological order. In context of Baluchistan and Sindh, the aceramic Neolithic is represented by Mehrgarh I, Kili Gul Muhammad I and Gumla I. The ceramic Neolithic is represented by Mehrgarh II, Kili Gul Muhammad II, Rana Ghundai I, Anjira I, and Mundigak I (Afghanistan). The Mehrgarh III, Kili Gul Muhammad III, Rana Ghundai II, Anjira II, and Amri I can be placed in the early Chalcolithic while Mehrgarh IV-V, Kili Gul Muhammad IV, Damb Saadat I, Mundigak II, Rana Ghundai III, Anjira III and late Amri I can be assigned to the advanced Chalcolithic. The early Bonze Age is somewhat subjective period, encompassing Mehrgarh VI, Dam Saadat II, Rana Ghundai III, Anjira IV, Gumla II, Nal Polychrome, and Amri IA in Baluchistan, Namazga II in Central Asia, Mundigak III in Afghanistan, and Shar-e-Sokhjta in Iran. The advanced stage of Bronze Age is represented by the Harappan sites as well as Mehrgarh VII, Damb Saadat III, Kot Diji, Amri, Nal, Kulli, Rana Ghundai, and Mundigak IV. Refer to Chapter V.6. for details.

This kind of periodization and classification does not tell us much about the cultural progression or change in ancient Pakistan except that it is useful in placing the various sites in some modicum of chronological context. Nevertheless, using this broad scheme, chronological sequences of various 'cultures' can be constructed for ease of study and comprehension.

An alternative schema of classification and Periodization

1. The Early Neolithic phase
2. The pre-Harappan (pre-urban) phase
3. The Harappan Urban phase
4. The post-Harappan phase

The culture-historical approach as the basis of periodization of the prehistory of South Asia into the Neolithic, Chalcolithic, Bronze Age, and Iron Age has been unanimously popular in South Asia throughout the past century. In fact, it is still the stuff of college and university text books in India as well as in Pakistan. The preoccupation of prehistorians with this approach has lead to a one-dimentional understanding of archaeological sequence (i.e. the linear development of society). Furthermore, the culture history approach sought to define archaeological cultures as ethnic groups, and generally explained their origins through concepts of diffusion and migration (5). For example, the similarities between the Hakra Ware from Cholistan with certain pottery from Baluchistan, which itself resembled in some respects with that of Iran, lead to an oftquoted conclusion that some Iranian

people migrated to the banks of the Ghaggar-Hakra river braid at certain point in time to colonize the fertile plains. Archaeological literature is replete of such examples.

The second fundamental flaw of the culturehistorical approach is the latent assumption that within cultural groups there is a tendency towards stagnation and conformity for proscribed behavioral norms. Internal development and cultural elaboration are seen to be slow processes, and any archaeologically visible changes are attributed to cultural diffusion and migration. It would be simple to assume a chronology that represents a series of discrete archaeological polities that remain in place for several hundred years before being replaced by a new static culture for the next several hundred. This is, however, not the case. First, the culture of a society is never static for any length of time. Second, it does not necessarily change under an external influence: internal agents of change are frequently more important. Keeping this in mind, it must be stressed that, for the purpose of this chapter at least, the cultural stages, phases and periods outlined in this section are merely arbitrary points along a continual line of social, economic, and and political development.

Pre-Harappan, Harappan, and PostHarappan: An alternative approach is to divide the whole Indus Age into three parts keeping the focus on the Harappan urbanization, chronological point of which is fairly well-established. The time period before the maturation of the Harappan Civilization is assigned the broad category of the Pre-Harappan period which is the central focus of this volume. This encompass the various shades of the Neolithic and the Chalcolithic, it also touches upon the early aspects of the Bronze Age. The *Pre-Harappan* is different from the *Ealy Harappan* and the Early Indus to be discussed elsewhere in this section.

Fairservis's Synthesis: In 1967 Fairservis synthesized the archeological data and visualized the development of civilization in South Asia, from the neolithic to the end of the Indus cities, through five stages (i) Pastoralism with limited cultivation; (ii) Developed cultivation and pastoralism; (iii) Fully developed sedentary village life; (iv) The period of urbanization; (v) Economic decline and the general abandonment of the Indo-Iranian Borderlands by

Fairservis's Synthesis
1. Pastoralism with limited cultivation
2. Developed cultivation and animal herding
3. Village farming societies
4. Flourishing urban centers
5. Abandonment of urban centers

farmers of developed villages. Gupta, on the other hand, presented a visual model of first urbanization in South Asia through six stages (i) Genesis, (ii) Formative Stage, (iii) Efflorescence, (iv) Affluence, (v) Quiescence, and (vi) Dispersal. In these and several other attempts, such as the one presented by Sankalia, the generic relationship of the known pre-Harappan cultures was traced to West Asia and not to the indigenous cultures.

The Baluchi and the Sindhi Traditions of Jim Shaffer: Jim Shaffer recognized that there was a greater amount of fluidity within Indus Valley cultural sequence, as well as a vast amount of regional variations (3). Shaffer's chronology is divided into Eras - a grouping of archaeological units that share a number of general cultural characteristics. These units do not represent evolutionary stages, and are not necessarily applicable to every site or region. Each of these Eras is then further subdivided into Phases that possess a sufficient number of characteristics, and that are bounded

spatially and temporally, in order to distinguish them from other contemporary Phases. However, it should be noted that boundaries, both temporal and spatial, need to be considered as flexible and often overlapping artificial entities - they are purely modern archaeological constructs derived from artifactual typologies and scientifically obtained dates. Shaffer divides the Indus Age into four eras: Early Food Producing, Regionalization, Integration and Localization, which have now become a standard text-book teaching. The first two eras, i.e. The Early Food Producing and Regionalization, concern us here as they represent the Early and the late Neolithic culture in the Greater Indus Valley. The other two eras are concerned with the urban culture that goes by the name of the Harappan Civilization.

Shaffer's Chronology of the Indus Age

Early Food Producing era Regionalization era
Integration era
Late Harappan
ca. 7000 - 4000 BC ca. 4000 - 2600 BC ca. 2600 - 1900 BC ca. 1900 - 1300 BC

The Early Food Producing Era (7000 BC onwards) refers to the Neolithic food-producing economy seen primarily at the site of Mehrgarh. Many of the essential traits of the Harappan Civilization have their roots within the Mehrgarh Phase of this era: food-producing economy, sedentary villagers with mud-brick architecture and the devel opment of lapidary and shell working techniques. Mehrgarh is the oldest known example of a Neolithic site within Ancient Pakistan, in fact in the whole of South Asia. This era is associated with a number of other village communities in Baluchistan dating from *ca.* 7000 BC to 4000 BC. The earliest periods at Kili Gul Muhammad and Rana Ghundai (5500-4000 BC) were characterized by the presence of mud-brick structures, chert blades, bone points, handmade pottery and a subsistence base centered upon domesticated sheep, goat, cattle, and the cultivation of wheat and barley.

The Regionalization Era , at its earliest 4000 BC continuing until 2600-2500 BC, incorporates the development of distinct cultural styles, particularly within ceramics, and the development of complex interaction networks. Divided by Shaffer into four phases - Balakot, Amri, Hakra and Kot Diji - this era represents the emergence of cultural and social complexity within several discrete, but interlinked, cultural groups. Recently, archaeologists have added further regional phases as new archeological evidence comes to light - such as the Ravi Phase (7).

Communities within the Regionalization Era maintained many of the characteristics of the Early Food Producing Era, such as the use of microliths, the consumption of wild species and storage of surplus. However, the most significant development of this period was the shift in population from the uplands of Baluchistan to the floodplains of the Indus Valley. In turn, this tradition from one ecosystem to another impacted upon the technology, subsistence and social and political organization of the inhabitants. The simple mudbrick architecture of Merhrgarh continued during the early phases of the Regionalization Era, but was superseded by increasingly complex urban form, with planned streets and fortification. Ceramic technologies and craft specialization also developed, and the subsistence base became ever more dependent upon domesticated species. The fourth millennium BC also saw the development of trading centers within the IndoIranian plateau at sites such as Shah-e-Sokhta and Mundigak, both of which facilitated the movement of goods from the Indus Valley region westward.

Shaffer (3) distinguishes between cultural traditions of Baluchistan and the Indus Plains. He

recognizes a third tradition, that of Helmand.The Early Food-producing Era of the Greater Indus Valley, mainly known from Mehrgarh period IA, is the Baluchi tradition while the rest of the Indus Age, up to the onset of the Iron Age, is the Indus tradition. Although these two 'traditions' have been extensively referred to in the literature, one fails to see the practical utility of such a classification and periodization.

The Indus Age: Credit goes to Gregory Possehl for doing away with such cumbersome terms like "Baluch Cultural Tradition" , "the Indus Tradition", the Pre-Harappan Cultures", etc and replacing it with an attractive but still descriptive term: *The Indus Age*. Present estimates of chronology would suggest that we visualize its beginnings around 7000 BC, coinciding with the earliest settlements in Baluchistan, the domestication of plants and animals and the beginning of farming and herding. The expansion of agriculture within Baluchistan, and the Indus plains is an important part of this story and he places it somewhere between 4,500 and 3,000 BC. The cities, the best known of which are Mohenjodaro and Harappa, were functioning urban centers for about 500 years and it is convenient, and reasonably accurate, to propose that they can be dated to the second half of the third millennium, or 2500 to 2000 BC. This period is often called the Mature Harappan, or the Harappan or Indus Civilization. Soon, probably between 2000 BC and 17000 BC, the high culture and urban economy of the Indus Age came to an end. Its agricultural and pastoral economy, however, continued to grow, so did the population in the Greater Indus Valley. It is during this time that ancient Pakistan, especially the upper Indus Valley experienced a profound cultural change which, for want of any other suitable name, we may call the *Vedic Transformation*. A rapidly increasing population and the renewed cultural dynamism, coupled with the use of Iron for tools, propelled the people of Punjab eastward to colonize the Indo-Gangetic Divide and beyond and those of Sindh to expand into Gujarat. This coincides with the end of the Indus Age. In this volume, we are concerned with the time period that spans from the Neolithic to the emergence of Urbanism, leaving the rest of the description of the Indus Age to the next volumes.

Possehl's Cultural Stages of the Indus Age: Shaffer's periodization of the Indus Age and the sequence of its regional cultures was a bold attempt at systematizing the prehistory of Pakistan but it is somewhat involved and rather rigid. A happy balance, it seems, is that proposed by Possehl (8). The basic idea is that of Shaffer. It divides the prehistory of the Greater Indus Region into a few wellrecognized Stages; each Stage is then divided into different Phases that can be based on technical criteria or socio-economical characteristics of the time. Each Phase can then be analyzed in terms of Periods that can be rather fuzzy. The table below presents such a classification. In this scheme of distinct sets of artifacts and the ways in which the people who made them were occupied. Phases are not *defined* by a chronology, either relative or absolute; but a chronology can be *ascribed* to them. The independent variables in this equation are the artifacts and activities of ancient peoples. The dependent variables are the relative and absolute chronological facts that archaeologists gather as part of their research. The Phase or the Culture is first defined and the chronology allowed to emerge from observation, analysis and additional data, such as radiocarbon dates. While history is occasionally played out in a way that leads to the isolation of moments of historical importance that can be fixed with considerable chronological precision, in general this is not the case with prehistory. Thus, the chronological order between Stages, Phases, and Periods must be taken as a somewhat fuzzy idea. Stages, Phases, and Periods do not have crisp beginnings and sharp endings.

S t a g e s a n d P h a s e s o f t h e I n d u s A g e
Stage One:

Stage Two:
Stage Three:
Stage Four:
Stage Five: Stage Six:

Early Settlements and Beginning of Agriculture
Kili Gul Muhammad phase 7000-5000 BC Basket Marked Phase 5000-4300 BC

Developed Village Farming Societies
Togau Phase 4300-3800 BC Kechi Beg Phase 3800-3200 BC Hakra Ware Phase 3800-3200 BC

Early Indus Cultures
Amri-Nal Phase 3200-2600 BC Kot Diji Phase 3200-2600 BC Damb Saadat Phase 3200-2600 BC

Harappan Civilization
Early Maure Phase 2600-2500 BC Mature Phase 2500-1900 BC Late Harappan Phase 1900- 1700 BC

post-Harappan Cultures 1700-1000 BC Iron Age 1000- 500 BC
(*This Table has been extracted from Groggy Popssehl (Indus Age) but presented in modified form*)

things, the notion of archaeological "periods" with hard boundaries has been eschewed in favor of looser notions of "phases" with fuzzy transitions. This is probably the only way that archaeological data could make any sense for a student of prehistory. One advantage of this scheme of periodization is that it accommodates most of the ideas offered from time to time and discussed above.

In spite of its anthropological content, the Phase is still an archaeological construct based on an assemblage of material culture, which can be associated with a subsisting regime, patterns of trade and communication, socio-cultural institutions and a geographical area. In some ways, the Phase is like the old notion of an archaeological "culture", a term used rarely in today's anthropological archaeology but used frequently in this volume for historic connotations it represents. Phases are then

Contending with change within a Phase, even one that is 700 or 800 years long is difficult. Anthropological theory says that no culture would be entirely stable for such a protracted period of time. Still, the present level of sophistication available to handle the Phase of the Indus Age does not really allow us to define just what might be changing in most Phases. The Togau and Kechi Beg Phases, for example, may admit a degree of regional differentiation, but there is nothing that defines an early Togau Phase from a latter one.

Archaeologists must, by necessity, rigidly adhere to meticulously defined 'assemblages' but the student of history does not such a compulsion. Instead of saying Mehrgarh I, they may talk about it as the earliest period of occupation at Mehrgarh. The same 'loose talk' they may employ in discussing the various sub-periods. Moreover, they often use Phases and Periods interchangeably, depending on the context of the subject matter. Thus, the student of prehistory is very much lax in using the above-mentioned archaeological terminology as long as it conveys the general understanding of the subject matter under discussion. In the following pages, we shall try to adhere to the archaeological terms but here and there we may disregard this strict scientific categorization in the interest of simplicity and a general description of historical nature.

Keeping in view the above considerations, we shall periodize and sequence the pre-urban, (the Neolithic and post-Neolithic) cultures of the Greater Indus Valley as follows:

1. The Earliest Neolithic Settlements
2. Village Farming Communities
3. The Early Harappan cultures

VI.2. The Earliest Settlements



The earliest agricultural settlements at the onset of Holocene in Baluchistan constitute the first Stage of human history within the gambit of the Possehl's classification of the

Indus Age, described in the later part of last chapter. This is the economic and cultural stage when humans were emerging from the Stone Age and entering into the Neolithic - a way of life when foraging gave way to food production and nomadism gave way to a sedentary life. This fundamental change in the way of subsistence triggered a series of other cultural changes that were to come in rapid succession, culminating within a short span of four millennia in an expansive urban culture throughout the Greater Indus Valley which we know by the name of the Indus or the Harappan Civilization. In so many ways, this Stage - the Stage of the Early Settlements in Baluchistan is the beginning of the prehistory of Pakistan.

The Transition from Hunting-Gathering to Food Producing: The transition from huntinggathering to food producing has been referred to at several places and in several contexts in the foregoing text of this book. We observed that this transition was neither a sudden change nor a linear process. It was a protracted process and we really do not know the temporal length of this transition in the Greater Indus Valley. We also observed that the Indus man was clearly emerging from the last Ice Age but was still engaged in a free-spirited struggle for survival under varied climatic conditions, honing his hunting and gathering skills by fashioning and utilizing ever improving tools, keenly observing the behavior of the wild animals he hunted, and experimenting with different plant seeds and fruit for their nutritional value. He probably tamed a few animals as pets and observed them breed under his care. The capabilities of different types of soils for growing various types of grasses, plants and trees must have caught his attention and the role of water to nourish these grasses and plants must have become quite evident to him. He chooses to live around lakes and natural springs where fresh water is available to him and for the animals he hunts. The ebb and flow of these water holes provides him the necessary vegetable food, such as seed bearing grasses and wild fruits. He must be residing in semi-arid valleys where some water was to be had downhill and game aplenty in the uphill. He could, thus, have his hunting and gathering at one place or at least in close proximity to each other.

His lifestyle is still nomadic but his wandering starts to decrease considerably. He begins to converge on specific spots to camp for extended periods of time. During these extended stays, he might have tried to divert water to tracts of wild grasses and fruit bearing trees so that they could grow in

abundance and yield him the grain and fruits in quantities. This is the time also when he learns to store some of his food for future use if it exceeded his daily consumption. In short, the man is ready for domestication of animals, cultivation of plants, storing his food, and living permanently at fixed locations. This time period we called the Mesolithic Transition in conformity with the type of tools he made and used, and the type of cultural and economic changes he went through. We have the archaeological remains of a large number of camps around the lakeshores in Sindh, the banks of small rivers and water-springs in parts of Las Bela and the delta of the Indus. We do not have any archaeological evidence of these hunter-gatherers in any part of Baluchistan but it does not mean that they were not there.

This transitional phase ushered man into an important period of his evolutionary history when he started to *produce* food instead of *obtaining* it from his environment. Domestication of various species of animals produced the specialized pastoral groups who appear to have continued in existence through the ages, even into modern times. Some of these pastoral people were nomadic but they nevertheless *produced* animals rather than *hunted* them in the wild. On the other hand, the domestication, or successful exploitation, of various species of wild plants produced the shift towards sedentary settlements, which largely subsisted on agriculture. This adaptation came to dominate the subsequent economic and cultural developments throughout Pakistan; the developments which are the topic of this Section in historical context.

At this point there is a marked shift in the geographical focus of Pakistan's archaeology. One now leaves the trail of the Late Paleolithic p e oples in Pothowar, the Rohri Hills, southern Pashtun country, or any other area they might be living in. One also looses the footprints of the Mesolithic hunters-gatherers-fishers in the plains of Sindh, the coastal regions of the Delta, the shores of various lakes, the banks of small rivers, and the foothills of the western mountain ranges. The interest no longer lies with hunters and gatherers and their microliths. Instead, it shifts to the growth of distinctly agricultural communities in the vast stretch of land between Makran and Bannu on one hand and the western fringes of the Indus plain on the other. This marks a span of about 4000 years, from ca.7,000 BC to ca. 3,000 BC.

It is during the early part of this time that some major transformations take place to the west of the Indus, and it is in the course of this development that the roots of the subsequent Indus Civilization lie. Starting with this chapter we shall follow the course of these cultural changes and witness the transformation of early rudimentary settlements into mature agricultural villages and small towns which were the precursors of the urban civilization that followed.

The relationship of the two trends, i.e., domestication and herding of animals, and the cultivation of certain plants and trees leading to agriculture, in their earliest stages is still not clear. Moreover, it must be repeated that in an area as large as Pakistan, with its major divergences of climate and physical environment, it is most unlikely that a single pattern would be found throughput. Furthermore, the Indus man did not stop being a huntergatherer altogether; he merely supplemented his *gathered* food supply by *produced* grain, and his hunted meat with produced meat. With time, the hunting-gathering diminished in importance and agriculture and pastoralism took its place.

Beginning of the Neolithic in Pakistan: The beginning of the Neolithic, i.e., the living at fixed locations, food production through agriculture and animal keeping, the production of crafts, etc., has been amply discussed in Section III, IV, and V; at the risk of repetition, here we touch upon only a few

aspects and that too only in summary.

It is well-known that by 10,000 BC or at the most a millennium later, humans were experimenting with the domestication of plants and animals, the earliest evidence of which we gather from South-West Asia, especially from the so-called Fertile Crescent. We do not have such a robust evidence from anywhere in Pakistan. When we meet the post-Paleolithic Indus man, he was already an agriculturists and an animal herder in the Kachi plain on the border of Sindh and Baluchistan. We also observe him settling down in the Quetta Valley, again as a full-fledged food producer rather than a food gatherer. Other people living on the eastern slopes of the Sulaimans followed suit but somewhat later. Again, no evidence for the process of domestication. This factor gave rise to the archaeological belief that agriculture and the domesticated animals were most likely introduced to the Indus people by the farmers of South-West Asia. It was held that the countries of West Asia such as Mesopotamia, Syria and western Iran were more favorably situated for the birth and spread of civilization. The discovery of very ancient sites in all of these countries strengthened this hypothesis. This hypothesis was time to time challenged on various grounds and it does not represent the sole hypothesis for explaining as to how, where and when cultivated plants and domesticated animals originated.

Briefly speaking, Baluchistan is now considered as one of the centers where domestication of some plants and domestication of some animals did occur. Going back to the famous botanists, Nicole Vavilov, Lorenzo Constantini and Costantini Biasini, include the Baluch territory, physiogeographically speaking, in the Armeno-Iranian province of the eastern Irano-Turanic sub-region of which Vavilov spoke as one of the primary center of plants and animal domestication. The vegetation of these territories is characterized by plant associations in which Baluchistan represents a transition zone between thickly growing juniper forests of the steppe and sparsely growing small trees and bushes of the slopes. Such a region is ideal for the growth of a variety of grasses, including barley and wheat. Jean-Francois Jarrige has observed that Baluchistan, possibly including the Pashtun country along its western borders, might have been part of a large geographical area within which the wild progenitors of potentially domesticable plants would have been found. These are characterized by the additional presence of pistachio, almond and juniper as significant elements of a steppe-forest in a climate with hot, dry summers and cold, wet winters. Taking all this evidence together, more and more scholars now tend to agree that the domestication of barley, and also possibly of wheat, can be traced as easily to Baluchistan as to the Levant or the Fertile Crescent generally. Moreover, the domestication of goat, sheep, and cattle is likely to have been domesticated in Baluchistan and diffusion from west-to-east did not play a significant role. Possehl has recently broadened the ‘core’ area of original domestication from the Mediterranean to the Indus and Pakistan is now increasingly being included in the ‘nuclear’ zone for the domestication of barley, wheat, chickpeas, lentils, etc, as well as goats, sheep, and cattle.

As described in Section II, the term Neolithic is currently used, especially in archaeology and anthropology, to designate a state of cultural evolution or technological development characterized by the use of some specific and unique stone tools, sometimes composite and often polished, the existence of early settlements, a subsistence economy that was largely based on domesticated plants and animals, and presence of such crafts as pottery and weaving. The time period and cultural content indicated by the term varies with the geographic location of the culture considered and with the particular criteria used by the individual scientist. The domestication of animals and plants usually distinguishes the Neolithic cultures from earlier Paleolithic or Mesolithic hunting, fishing, and foodgathering cultures. The termination of the Neolithic period is marked by such innovations as the

rise of urban civilization, the introduction of metal tools or writing. Again, the criteria vary with each case.

During the course of past century, patient efforts of archaeologists have brought to light remnants of the Neolithic settlements in many parts of the world. Chronologically, they do not belong to the same period of time, but cover a wide span. The earliest known Neolithic settlements are in SouthWest Asia, around the northern and eastern periphery of the Tigris-Euphrates valley, dating between 8000 BC and 6000 BC. There the domestication of plants and animals undertaken by the Mesolithic Natufian peoples lead to the establishment of settled villages based on the cultivation of cereals, including wheat, barley, and pluses and raising cattle, sheep, goats and pigs. This region has been extensively researched during the past half a century and the archaeological data have provided an outline of the steps ancient man took in his evolution from intensive food gathering to full-fledged food production. The record is remarkable in its relative completeness, even though there are numerous gaps. This research, therefore, comes handy in our case by drawing parallels with ancient Pakistan where the research in the primary-village stage is rather cursory and the relevant data quite scanty.

About 7,000 BC Neolithic culture spread through the Nile Valley and at about the same time, it developed in Central Asia, Baluchistan and probably some other parts of Pakistan. The Neolithic culture of the Middle East developed into the urban civilization of the Bronze Age by 3,500 BC and some of the agricultural settlements of ancient Pakistan got transformed into urban centers of the Indus Civilization a little later. Two phenomena characterize this stage: a gradual evolution into developed village life, and a gradual spread of agriculture and animal herding. Village communities of as many as 250 to 500 or more individuals were common enough, with lesser and lesser dependence upon hunting as a secondary economic resource. We can recognize the growth of a full-fledged sedentary society, less self- contained than the earlier rudimentary settlements and camps of Mesolithic foragers. This means simply that an increasing number of specialists became necessary to handle effectively the administration of a society whose families lived together the year round and whose collective effort in the cultivation of crops and the herding of food animals provided a total production which exceeded the individual subsistence requirement for that year - in other words, a society with a *surplus* which could be used for the acquisition by barter, or exchange, of things not found locally.

The making of pottery is an important development in the Neolithic period. Food could be prepared, it could be transported in prepared form, and it could be stored. Ceramic vessels could be used for the preservation of water, meat, fish, cereals, vegetables, and fruits. These vessels were also used as a “canvas” upon which the artist drew designs. The shape and the decorative designed changed from region to region and from time to time. These changes tell the archaeologist a great deal about their origin and the diffusion of technology and culture from one region to another. The Near Eastern Neolithic culture in the “cradle of civilization” was devoid of pottery. Instead, stone vessels were used for a long time. In Baluchistan too, the early Neolithic is aceramic, that is, without pottery, but pottery develops rather quickly.

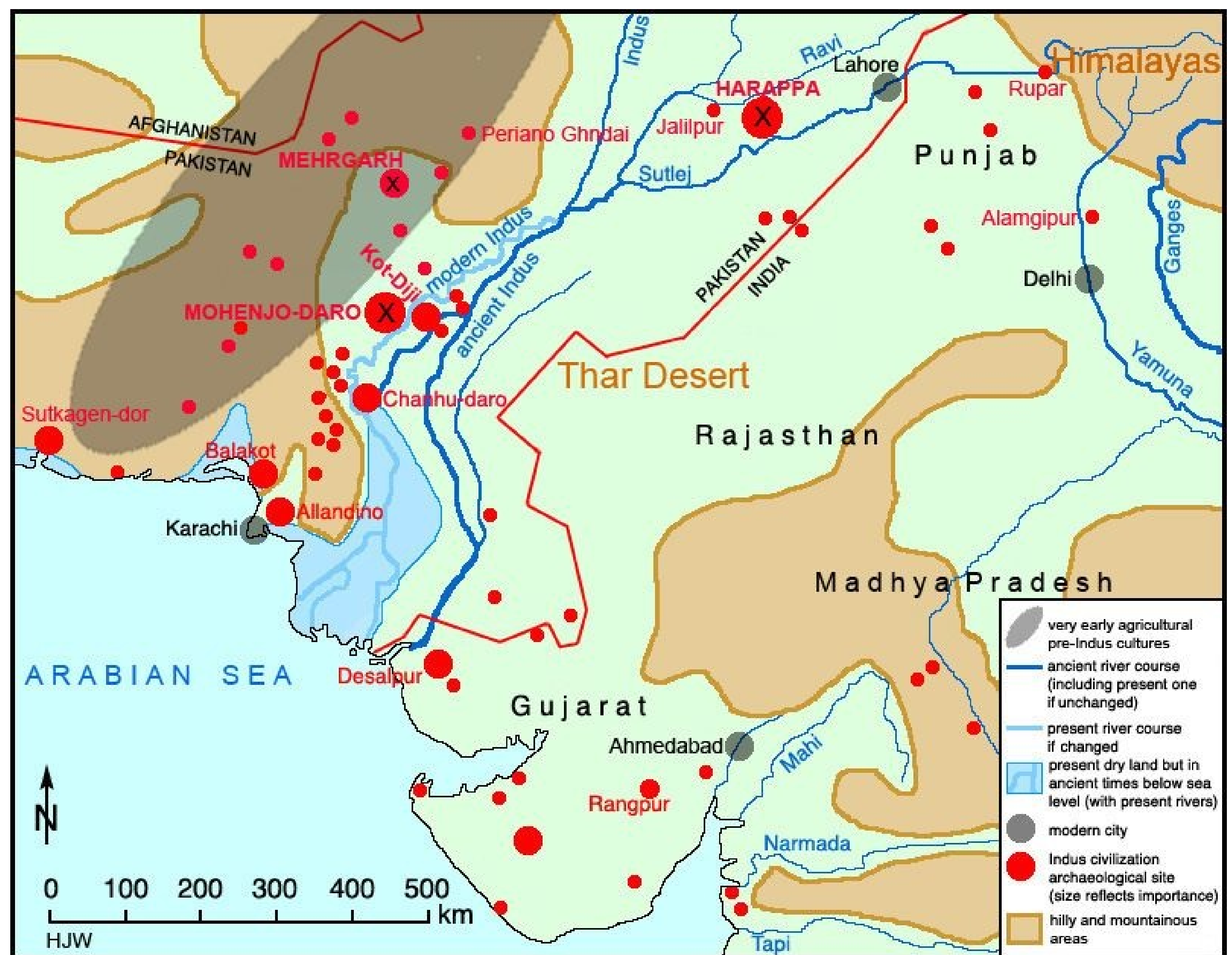
‘From foraging to agriculture’ is often designated as “Neolithic Revolution”, thanks to its first coinage by Childe and it has now become an accepted characterization. A ‘revolution’, if it means a sudden change, it was not. ‘Revolutionary’ changes did occur but it was a very slow and gradual process. Methods of collecting food by hunting and fishing were replaced by animal husbandry

gradually and gathering plants' seed and fruits were replaced by seed agriculture slowly. Similarly, the nomadic movements were replaced by living at fixed settlements through an equally long-drawn process. At least, this is the evidence from Pakistan. Additionally, not all areas adopted this change at the same time. Just like the case in South-West Asia where one region took the lead in food production and the neighboring regions followed, in Pakistan's case Baluchistan took the lead and other regions followed.

The inhabitants of Baluchistan began to exhibit the Neolithic culture quite early on into the Holocene, that is, just after the end of the last ice age. We do not known when this process started but we have positive evidence for neolithic settlements in the Kachi plain by 7000 BC and in the Quetta Valley by 6000 BC. There are a few other sites, such as Gumla on the eastern flanks of the Sulaimans, which are dated somewhat later. Archaeological research of the past three decades has shown that the previous tool making technology of working flints and stones continued but they now exhibited more sophisticated shapes. Man came out of the natural dwellings, such as caves and rock shelters, and started to build more permanent structures, first with cobble stones, then with clay mixed with straw and still later with sun-dried bricks. By early 7th millennium BC, we find the Indus man on the path of "caves-to-villages" and by 5th millennium BC, almost the whole region witnessed the development of agriculture, pastoralism and settled communities, save a few pockets in the north. Also associated with permanent or semi-permanent settlements were a series of new crafts involving important technical discoveries. Among these were the innovations in tool making, the manufacture of pottery, however crude and however basic, and the development of decorative art.

Precious items found in the graves of early Neolithic sites, such as Mehrgarh in Kachi plain, provide evidence for the existence of a network of long-distance exchange even during this formative period. There were beads made of turquoise from Persia and Central Asia, lapis lazuli from northern Afghanistan and shells which must have come from the coast 500 kilometers away. The rise of handicraft is clearly in evidence, the most important of which is basket weaving from reed and grass. These baskets were sometimes lined with bitumen to make them waterproof. Handmade pottery apnorm but some nomadism still persisted. There is strong evidence that settled communities coexisted side by side with nomadic pastoral communities in a symbiotic relationship. This pattern of subsistence persisted to even modern times in some areas of Pakistan.

Of course, the Neolithic developments in Baluchistan did not occur in vacuum: the stirrings of sedentary living and food production are also noticed in the neighborhood, especially in northern Afghanistan and southern Turkmenistan. It is interesting to note that all these areas, that is, Baluchis



Very early agricultural sites (green dots) in relation to other Neolithic and post-Neolithic settlements (red dots). Shaded area denotes the general area of settlement by early, but not necessarily the earliest, Neolithic people with rudimentary agriculture and animal husbandry. The site of Mehrgarh is the earliest Neolithic site discovered so far, followed by Kili Gul Muhammad.

peared. It was soon followed by another type of pottery where woven baskets were used as molds. Firing of pottery also ensued. Although subsistence mainly depended on agriculture and pastoralism, hunting and gathering still played an important role. The presence of date and jujube (*ber)* stones and the bones of wild animals mixed with those of domesticated animals in early strata at Mehrgarh is the evidence. Similarly, sendentism became the tan, Balkh, and southern Turkmenistan, are located on the slopes of the Iranian Plateau, environmentally mimicking the 'hilly flanks of the Fertile Crescent' in the Near East.

The Early Neolithic Settlements: Early food producing peoples are well documented in Baluchistan. Mehrgarh is the key site in this connection, followed by Kili Gul Muhammad and Rana Ghundai in Baluchistan, Gumla at the Gomal/Indus

The site of The site of

Pishin, to the north, however, a site of the same **phase was located on a knoll which rose on a gravel bluff or terrace of a perennial running stream, the country close to being unsuited for agriculture.**

It is highly likely that the piedmont areas Early Settlements**!along the Sindh Kohistan and Kirthar Range also have sites of these phases, possibly associated with the *nais* and springs of the region. One site,**

confluence near Dera Ismail Khan,, and possibly
Tharro Hill in Sindh. There are some other but
confluence near Dera Ismail Khan,, and possibly
rather minor sites, mostly in Baluchistan. On the
Tharro Hill in Sindh. There are some other but
basis of this information, we may divide the devel
rather minor sites, mostly in Baluchistan. On the opment of early Neolithic in Pakistan into two dis
basis of this information, we may divide the devel

tinct phases: opment of early Neolithic in Pakistan into two distinct phases:1. Aceramic Neolithic or Kili Gul Muhammad phase: 7000-5000 BC.1. Aceramic Neolithic or Kili Gul Muhammad phase:

7000-5000 BC.2. Ceramic Neolithic or Burj Basket-marked phase:be built and rough stone is occasionally used for foundations.Tharro Hill, which may have been occupied during

Ancient Pakistan - An Archaeological History

2. Ceramic Neolithic or Burj Basket-marked phase: **this period of time, is located near the active course** 6,000-4500 BC.

Ancient Pakistan - An Archaeological History **of the Indus River and could indicate the early**

Mehrgarh: By far the best evidence for an early agricultural village in Pakistan

vironment. Although no direct evidence has come

comes from Mehrgarh, a large complex site situated on the Kachi Plain of the

forth so far, the site of Gumla at the confluence of the Gomal and the Indus rivers near Dera Ismail

Indus Valley. Mehrgarh is the only site in Pakistan, in fact in the whole of

Khan may be another site of this nature. These two

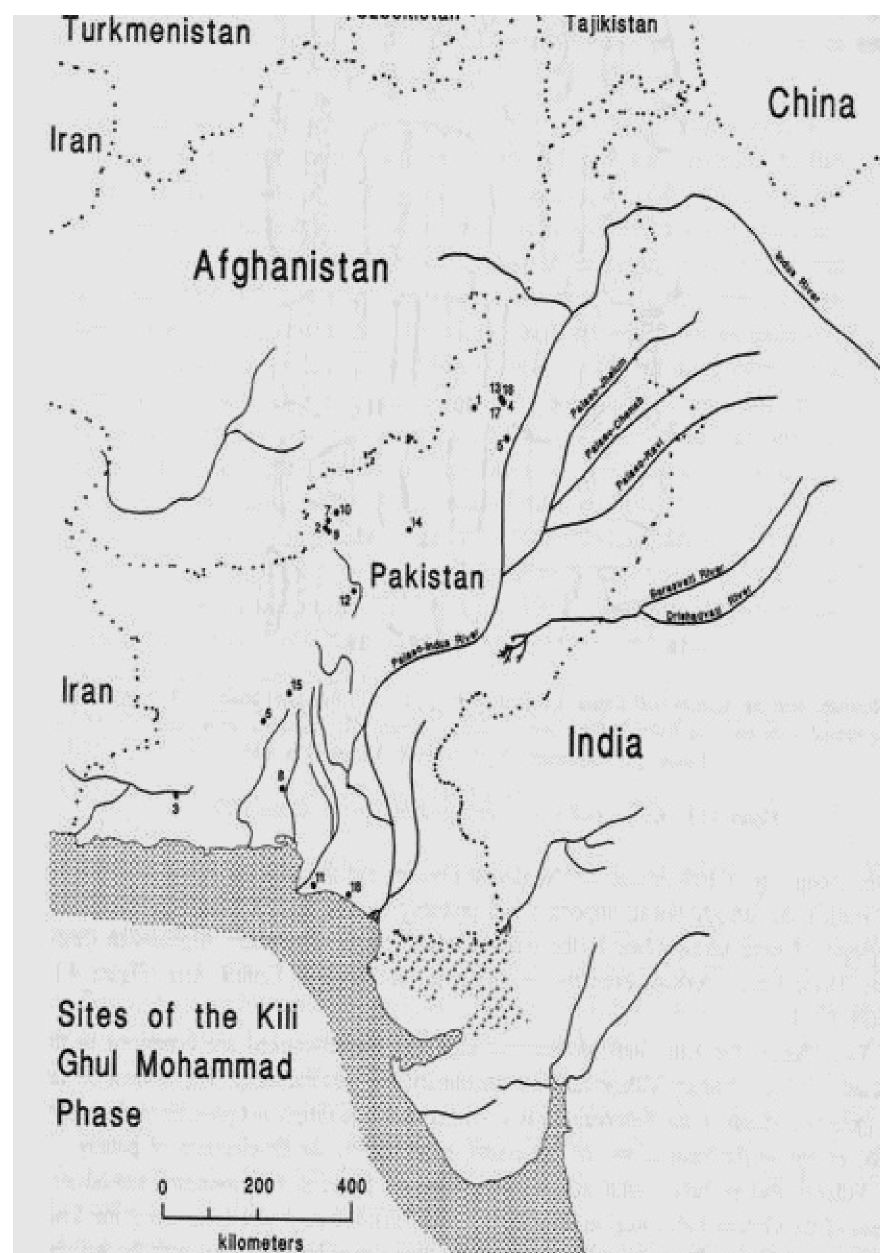
Central Asia and the subcontinent, to have revealed such a long and continuous

marked, are combined in the present discussion:

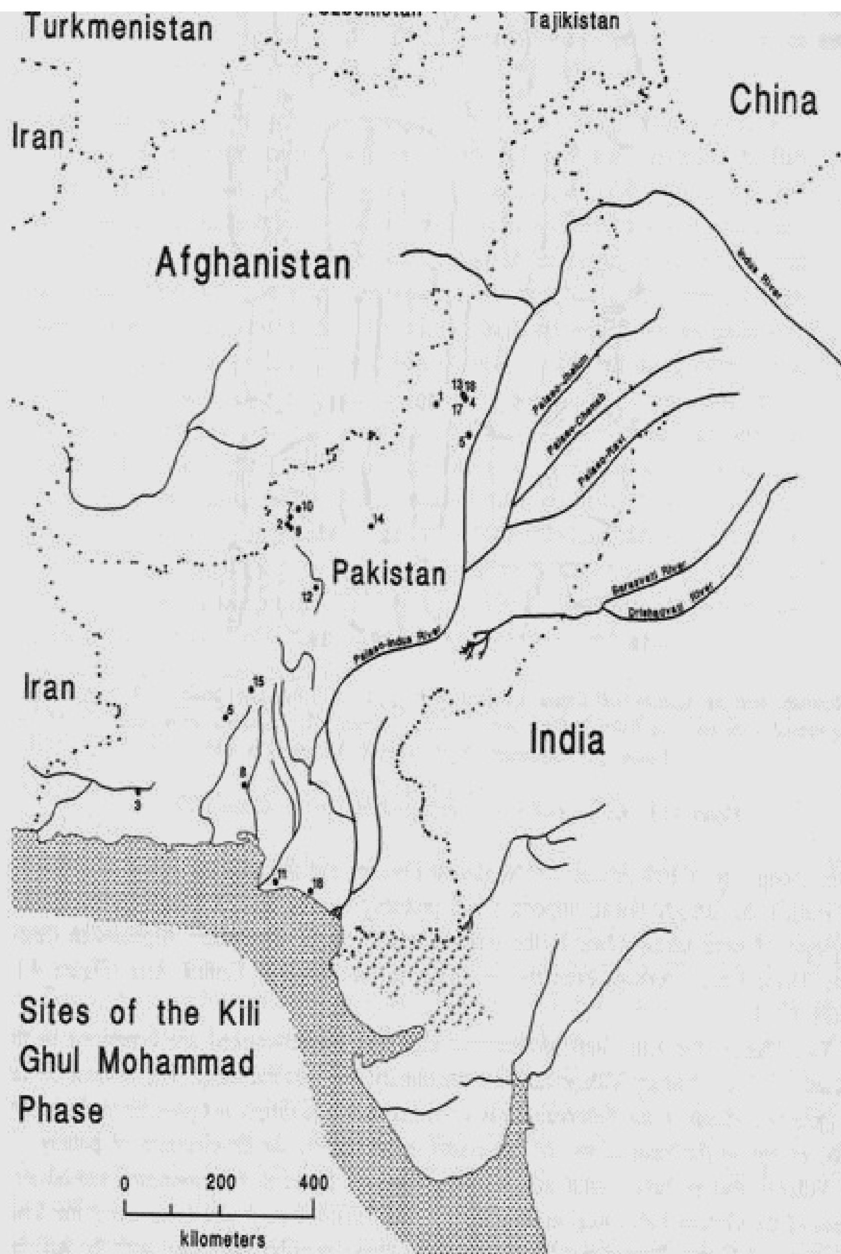
archaeological sequence. Its significance in the archaeology of Pakistan as a

ited that it is simply not possible to distinguish them,

whole lies in the discovery of the evidence of wheat-barley-cattle-sheep-goat domestication, the only tably the development of pottery. combined evidence of its kind in the region. Considering the significance of the site of Mehrgarh and the general continuity of occupation here into the Indus civilization period, it is important that we try to understand, however briefly,



Map of sites of the Kili Gul Muhammad Phase
(after Possehl)



Map of sites of the Kili Gul Muhammad Phase
(after Possehl)

the geographical character

Sites of Kili Gul Muhammad Phase (Aceramic Neolithic
Sites of Kili Gul Muhammad Phase (Aceramic Neolithic

and Phasse) (significance of its
The aceramic or Kili Gul Muhammad phase location. Mehrgarh and the

refers to the **earliest Neolithic** developments; it
refers to the

takes its name from the site of Kili Gul Muhammadsite of Nausharo lie a little to

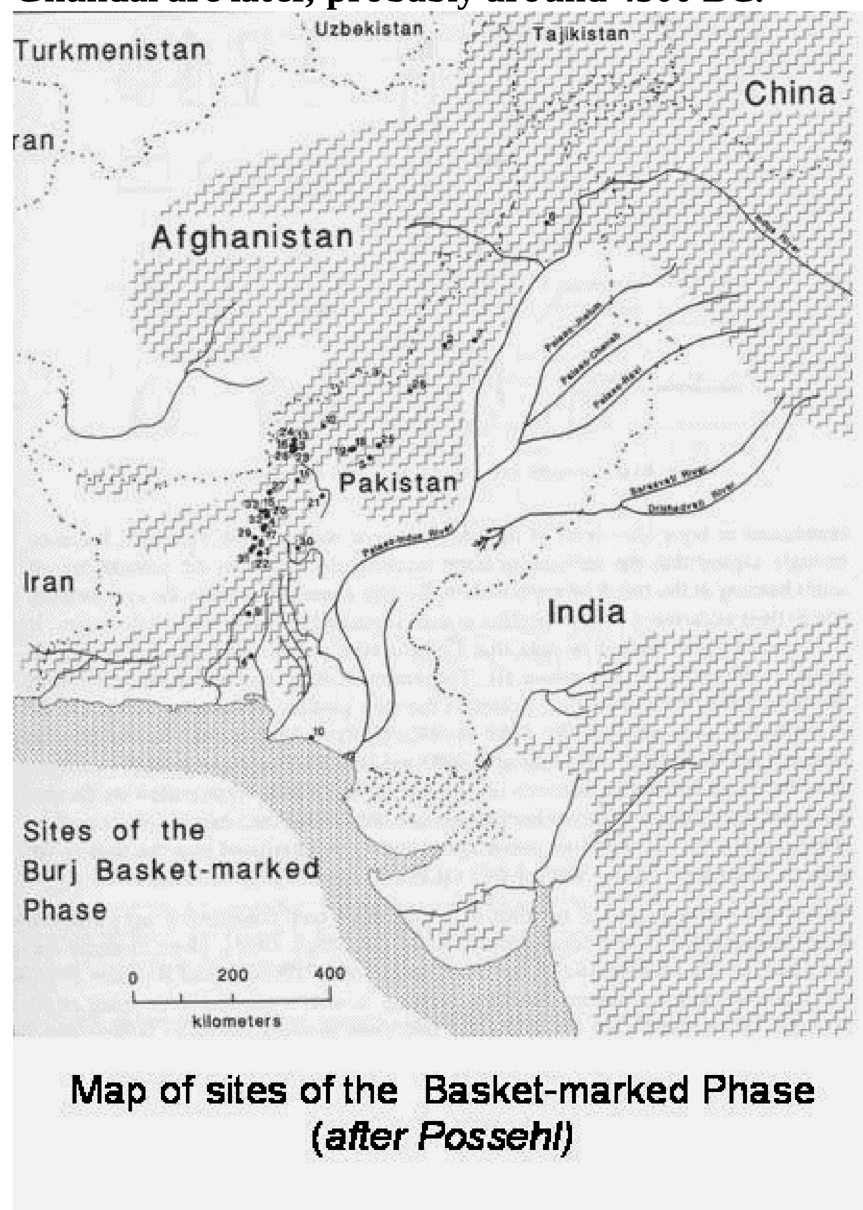
takes its name from the site of Kili Gul Muhammad
in the Quetta Valley where an aceramic settlement

the southwest of Dadar in the

settlement was first discovered. The chronological
settlement was first discovered. The chronological

dates there did not go father than 5000 BC but a Kachi plain. Sibi lies about

later discovery at Mehrgarh pushed these dates
beyond 7000 BC. The dates at Gumla and Rana
beyond 7000 BC. The dates at Gumla and Rana
Ghundai are later, probably around 4500 BC.



Map of sites of the Basket-marked Phase (*after Possehl*)

northeast of Sites of the Basket-marked Phase (Ceramic Neolithic

This **Phase) (*from Possehl*)Sites of the Basket-marked Phase (Ceramic Neolithic** This **Phase) (*from***

cultural phase is totally aceramic, that is, no pottery Dadar. This area and the Mehrgarh: By far the best evidence for an has been found. At Mehrgarh, it is represented by

has been found. At Mehrgarh, it is represented by early agricultural village in Pakistan comes from

Period I and dates to ca. 7000 BC. Other sites ofas a whole Mehrgarh: By far the best evidence for an

this early phase were located within a few of Mehrgarh, a large complex site situated on the this early phase were located within a few miles of early agricultural village in Pakistan comes from

extending in the south up to Kachi Plain of the Indus Valley. Mehrgarh is the only

Kili Gul Muhammad, and all but one of these were Mehrgarh, a large complex site situated on the

in the proximity of a watercourse. It is of interestexperience site in Pakistan, in fact in the whole of Central and

in the proximity of a watercourse. It is of interest

Kachi Plain of the Indus Valley. Mehrgarh is the only South Asia, to have revealed such a long and con**that these sites are concentrated in or about the** site in Pakistan, in fact in the whole of Central and

most fertile and best-watered part of the valley. In

extreme heat, reputedly the

tinuous archaeological sequence. Its significance in South Asia, to have revealed such a long and conthe archaeology of Pakistan as a whole lies in the

Pishin, to the north, however, a site of the same 387 discovery of the evidence of wheat-barley-cattle

highest in the Indian
Page 177 subcontinent, in summer.427
Page 177 However, from the irrigation point of view the area cannot be bad. Numerous

tinuous archaeological sequence. Its significance in The entire Period I is now considered to the archaeology of Pakistan as a whole lies in the represent the aceramic/Kili Gul Muhammad phase immensely complex. A synthesis for it emerged

discovery of the evidence of wheat-barley-cattleand the whole of Period II is considered to constirather late in the excavations thae and sometute the Basket-marked phase. Taken these two small dence of its kind in the region.of straitigraphic contaminationperiods together, the occupation would constitute amlunt

In the present context, the MG I and MG II the earliest neolithic settlement in the entire Southseems to be present (8). Thus, the dates for the are of prime concern to us. Taken as a whole, the Asia. Mehrgarh has already been adequately cov early Neolithic settlement in this area are entirelyuered in Section V; we shall, therefore, skip here any provisional at this time, but in general agreement there was a settlement thereat the beginning of the additional comments.with other recent chronologies. The beginning of

eighth millennium BC (8). The straitigraphy at the **Kili Gul Muhammad:** The site of Kili Gul MuIn the aceramic Phase at ca. 7000 BC is a rerasonhammad is located just north of Quetta, in the plains near Zarghun Mountains, out of which flows the Hanna River. Fairservis and his associates conavailable. ducted an extensive survey of the area and excavated the site. It provided evidence for the earliest occupation by food producers of Baluchistan then so far known. In a cut which reached a depth of 11 meters it was discovered that the lowest 5 meter was representative of a people who, when they first occupied the site, built their huts of pise or probably wattle and daub. They had herds of goats, sheep, and cattle, and presence of one or two sickle blades suggests that they cultivated a cereal crop. They also had ground-stone tools as well as those of chipped flint. In the earliest periods (KGM I) these people do not seem to have made and used pottery, but later they did employ a crude handmade, sometimes basket-marked ware (KGM II), which they occasionally painted with simple wavy lines. In these later periods mud-brick was commonly used for the houses, though pise was also common. Points and spatula-like implements of bone also occur in these levels, the latter only in the later periods.

able esteem,ate, given the modest samount of information that issmall amount of straitigraphic contamination seems Ending the Burg to be present (8). Thus, the dates for the early Neo

lithic settlement in this area are entirely provisional at this time, but in general agreement with other recent chronologies.

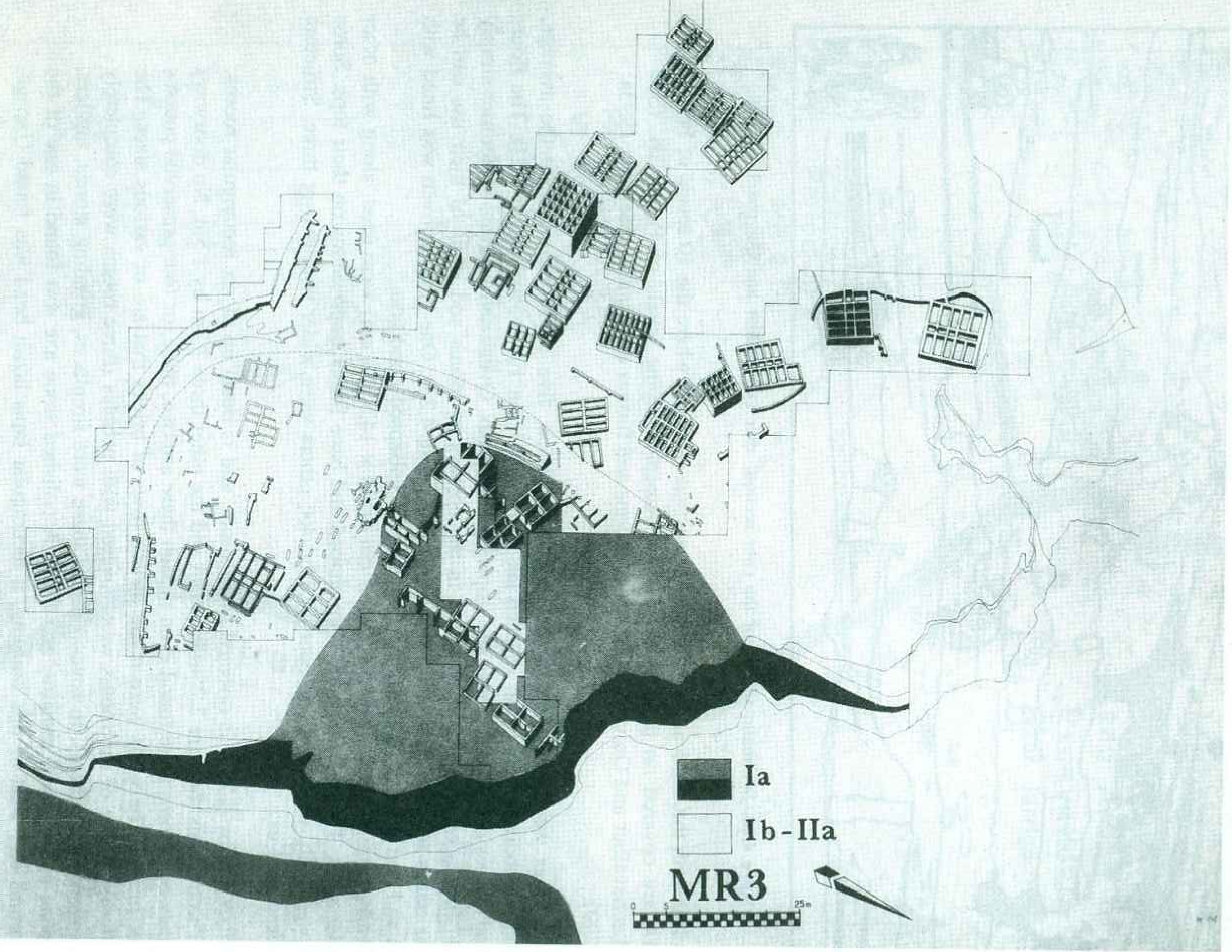


Figure 4.21. Plan of MR3, with architecture of Periods I and II, after Quivron 1991: 62

Plan of MR3 at Mehrgarh with architecture of Period I and II
Plan of MR3 with architecture of Period I and II

The beginning of the aceramic Phase at ca.
Kili Gul Muhammad III witnesses the full appearance of the open-bowl black-on-reddecorated and wheel-made pottery that occurs at Mundigak I. The evidence demonstrates larger population and more permanent settlements than hitherto. On the basis of the similarity in pottery designs of KGM III and Mundigak I, it can be argued that some of the population migrated to Mundigak and the surrounding area.

Without a break, these settlements of the Quetta valley continue growing larger in size and increasing to eighteen in number. A new pottery type, called Kechi Beg Ware but well exemplified in Mundigak I, arrives full-blown at this time. Architec

at
ture continues to be limited, as far as we know, to Basket-marked
Phase
(ceramic
7000 BC is a reasonable estimate. Ending the ceNeolithic) small houses, but with several rooms. Bricks are the43000 BC is also a rreasonab;e proposition from main medium of construction for the houses when the perspective of the radiocarbon dates for this they started tobe built and rough stone is occasion
dates for this Phase.
It appears that by and large

Phase. The internal chronology for the Kili uGl ally used for foundations.the Period II as a whole, inclusive of its phases a, b, Radiocarbon dates obtained from samples Muhammad and Burj Basket-marked Phases has and c, is spread throughout the sixth and the first taken from the upper period of Kili Gul Muhammad I not yet beren worked out but according to Jarrige,
half of the fifth millennium BC. The archaeological gave dates around 3300 BC, so it is entirely possi the Period I represents the 7th millennium and the
sequence listed in the Table below highlights the ble that the first settlements of this type in the re end of Period I, or the beginning of Period II, is

Mehrgarh Period I:
unlikely to be much later than ca.
gion may go back to a very early time period. The 7000, 6500, 6000 BC6000 BC. It Period I KGM aceramic occupation has three addiMehrgarh Period IIA :
Mehrgarh Period IIB:
Mehrgarh Period III:
5500 BCappears that by and large the Period II as ational dates, all of which fall between ca. 5000 and 5000 BC 4000 BC. The beginning of Kili Ghul Muhammad at4,500 BCwhole, inclusive of its phases a, b, and c, is *ca*. 5500 BC is a reasonable estimate, given the

spread throughout the sixth and the first half of the fifth millennium BC. The archaeological se[388] quence listed in the associated Table below highlights the continuity of occupation in this region.

modest amount of information that is available. There was considerable room for doubt about the status of Kili Gul Muhammad I but the later excavations at Mehrgarh have done much to ease the situation.

Gumla: A.H.Dani conducted one brief season of excavations at the mound of Gumla, about eight miles northwest of Dera Ismail Khan, just to the west of the Indus River, as part of his 1971 exploration of the Gomal Valley. It is a very small site but has a long sequence of habitation. The earliest level has been assigned to Kili Gul Muhammad phase and no material from the Basket-market phase has been found.

According to Dani, the first occupation of Gumla was made by people who did not use pottery. Microlithic tools and ground stone food processing tools are present. Hearths or 'community ovens' were also found. Animal bones are mentioned briefly in the report but have not been identified, although one cattlebone is specifically mentioned. No carbon dates are available for this occupation at Gumla. The general character of the occupation, especially the scene of semi- permanent occupation and ground stone, suggests that Dani's assessment of Gumla I as Neolithic is probably correct. A preliminary assessment of the occupation at Gumla indicates that it is like those at Kili Gul Muhammad I in the Quetta Valley and Mehrgarh I on the Kachi plain.

Gumla is an example of a lowland site where pastoral nomads may have camped during the winter is Gumla I, where the first occupation was by people who did not use pottery . Microlithic tools were in use along with ground stone food processing tools. Hearths, or "community ovens" were also found, but there is no architecture, not even ephemeral floors or post holes, but the exposure was very small.

Settlement Patterns: Archaeological exploration in Baluchistan, the Pashtun country, Kachi and western Sindh has revealed a total of nineteen sites that can be attributed to the Kili Ghul Muhammad Phase. They seem to be equally distributed between Baluchistan and the Pashtun country. With the exception of Kili Gul Muhammad, Mehrgarh and possibly Gumla, there is no guarantee that any of these places has been correctly assigned to either of the phases of Early Neolithic Settlements since this has been based on the description of surface debris. All these sites are rather small.

The thirty-three Basket-marked sites that have been identified have either the soft, chafftempered ware or basket-marked pottery without other ceramic associations. They are exclusively in Baluchistan, with a few exceptions that are in the Pashtun country. Like those of Kili Gul Muhammad Phase, the identification of these sites is quite tentative.

Early Neolithic Settlements in the Western Borderlands: The process of adaptation to environment, discussed above in context with Baluchistan, can also be seen taking place over much of Middle Asia from about 8,000 BC onward. Domestication of plants and animals was well in progress and small permanent settlements were being established throughout Near East and Central Asia. These primary settlements supplemented their food by producing it through agriculture and animal husbandry. Although no evidence of permanent settlements in Central Asia is available beyond Kandhar, there are unmistaken signs for the existence of domestication of goats and sheep. It is well possible and in fact likely that at some places where bones of domesticated animals have been found, barley was cultivated or at least harvested. In all appearance, the whole of the Iranian Plateau, especially on its outward slopes, was proceeding toward the cultivation of barley, the domestication

of sheep and goats, and establishment of permanent settlements or seasonal pastoral camps. It is not possible yet to ascertain the absolute chronology of these developments or even a relative chronology in relation to the developments in Baluchistan. Nevertheless, it is a general belief among archaeologists that most of these regions were walking towards the Neolithic in unison with each other. If there was difference in the pace of their progress, these areas were most likely not more than a millennium behind Baluchistan and Baluchistan not far behind the Near East.

While the Neolithic was profoundly touching the lives of the inhabitants of Baluchistan and those of the surrounding areas to its west, the areas east of the Indus remained untouched. Soon, agricultural villages would sprout all over Sindh, Cholistan, and probably also in Punjab, but the rest of the subcontinent would remain in Paleolithic or Epi-paleolithic stage. Notwithstanding the unsubstantiated claims of some archaeologists and archeo-botanists, there is no sign whatsoever for the development of agriculture and domestication of animals in India during the time period covered in this chapter. This lack of cultural and technological diffusion in the direction of west-to-east is not surprising for the geographic reasons discussed in Chapter I.2.

Important and probably closely related trends are in evidence in the mountains and plains of northern Afghanistan, extending north on to the slopes of the Iranian Plateau in Central Asia. Dupree conducted small-scale excavations at the sites of Snake Cave (Aq Kupruk I) and Horse Cave (Aq Kupruk II) on the Balkh River in Afghanistan. Horse Cave has evidence for domesticated sheep and goats at ca. 10,000 BC. This evidence is corroborated by the evidence from Snake Cave across the Balkh River, where there is evidence for domesticated sheep and goats at ca. 7500 BC. Although the existence of domesticated animals does not prove the existence of agriculture and in no way indicates the existence of a sedentary lifestyle, these discoveries may be a telltale sign of something important and should not be dismissed simply because they challenge the dogma of the Middle East as a ’nucleus zone’ for the domestication of barley, wheat, cattle, sheep, and goats as well as the development of primary village communities. The importance of this evidence lies in the realization that innovations leading to the domestication of animals and plants, in human subsistence practices, and the evolution of sedentary living were also taking place in areas other than the Middle East. This realization directly ties up with more and better data on the early domestication of plants and animals that led to sedentary lifestyle and the establishment of primary village societies in Baluchistan, as discussed previously in some details.

Summary: In this chapter we saw the evidence of the varied ways in which settled Neolithic cultures developed in a few selected parts of Pakistan, most notably in northern Baluchistan and on the eastern slopes of the Sulaiman mountain range. We compared these settlements with those contemporaneously developing in Central Asia and Afghanistan. We found clear evidence of very early Neolithic settlements at Mehrgarh in the Kachi plains, Kili Gul Muhammad in Quetta valley, and Gumal in the Gomal Pass. Possehl has listed some additional sites in his I*ndus Age - The Beginning*, a few of them, when excavated, may indeed prove to be of the early Neolithic. To be sure, there must be other such settlements on the eastern and northern slopes of the Iranian Plateau where some water was available year around for men and beasts.

The story of the earliest food producing settlements in Pakistan is in effect the story of the early periods of Mehrgarh and Kili Gul Muhammad. There is the period of early Neolithic culture which is largely agricultural and pastoralist. The residential houses are rectangular, some multi-room, made of sun-dried mud bricks. There are also compartmented buildings, also made of mud bricks, the

function of which is thought to be storage of gathered or cultivated food. Wheat and barley were cultivated, and cattle, sheep and goats were domesticated. There is evidence of some crafts and, though limited, some long-distance exchange contacts. Some hand-made pottery appeared at almost all of these settlements. Microlithic tools have also been found in abundance. Polished stone tools and those made of bone are also in evidence but there is no trace of metal. We may expect these 'primary' settlements to have lasted for a long period of time, perhaps for as long as two millennia (8,000 BC to 5,000 BC).

We also find the same type of evidence in Afghanistan, both in the Kandhar area as well as in the Balkh region, although no solid archaeological remains are on hand. There is, however, solid evidence for a few neolithic settlements on the northern slopes of the Iranian Plateau, that is, in southern Turkmenia.

In all probability, Baluchistan was in full partnership with the vast area to its west and the northwest in parallel development of agriculture, animal husbandry, and sedentism although there is only indirect evidence to support this proposition. The situation on the northern slopes of the Iranian Plateau, that is, in southern Turkmenia, is similar: here a few agricultural settlements are in fact in view a little later, the reference to which has been made earlier in the book.

The next discernible stage at Mehrgarh and the Quetta Valley settlements shows the appearance of pottery and intensification of agriculture, including the tending of domesticated animals. We may guess that during this time settlements were beginning to appear in other parts of Pakistan also. The settlements in Baluchistan and adjoining areas of the Indus plain have survived but we do not find any trace of such settlements in the the heart of Indus plains. If there were any in this area, they have almost certainly been submerged under the steadily rising alluvium.

Contrary to the situation in Baluchistan and the Greater Indus Region generally, the vast region of India was still peopled by Paleolithic and Epipaleolithic communities living by hunting and gathering. Despite the frantic attempts by a number of Indian archaeologists, some of them quite respectable names, in recent times, no evidence of organized agriculture settlements and permanent villages has so far been found in any part of India that can be traced to prior to the second millennium BC. At best, we observe nomadic pastoralists, some of whom may be living for extended periods of time in semi-fixed pastoral camps but not engaged in seed agriculture.

VI.3. The Development of Village Farming Communities

Village Farming Communities ! evidence but there is no trace of metal.

One should note that so far we have found archaeological traces of primary settlements with any degree of certainty only in the Quetta Valley and along the Bolan Pass up to the Kachi plains where, to our delight, Mehrgarh provides us a record of an uninterrupted occupation for several millennia, starting from nonceramic settlement of the earliest Neolithic time.


During the second half of the fifth and early
The next discernible stage at Mehrgarh and the Quetta Valley shows appearance
part of the fourth millennium BC, a new development begins to become apparent in Baluchistan,

beginning to appear in other parts of Baluchistan and the greater Indus system. adjoining parts of Sindh, and even across the Indus
We do not find any trace of these settlements, however, beyond Baluchistan. If

plains in Cholistan in southern Punjab. These de
there were any settlements in the Indus plains, they have almost certainly been

velopments we can now see as the spread of ma still dealing with Baluchistan. ture village farming communities and well
established pastoral groups in Baluchistan and beyond. Baluchistan appear to be shared by the apparently later
Neolithic adaptations Possehl divides this Stage into three cultural

wherever such settlements have been found. This suggests a strong continuity
Phases which are essentially three regional phases
from the Mesolithic transition to early settlements and then to the next stage of
of economic and cultural developments in Pakistan.
development, that is the development of mature agricultural villages. This also
The first two, Togau and Kechi Beg, pertain to Balu
Indus valley reach far deeper than hitherto believed. One of the most striking
chistan and roughly follow one another, while Hakra
things about both these early periods is that trade links with the Arabian Sea
Phase is related to the developments in the semi

arid region of Cholistan Desert and generally follows the Baluchistan’s developmental trajectory.These regional ‘cultures’ or developmental phases are largely recognized by their respective pottery or, in some cases, by their other artifacts. In a few instances, the architect of the time and burial rites also come to our aid.

Togau Phase: 4,300-3,800 BC Kechi Beg Phase: 3,800-3,200 BC Hakra Wares Phase: 3,800-3,200 BC

The approximate chronology for this Stage is given above. The chronology of Mehrgarh III is in general agreement with the date given here. The Togau Phase takes its chronology from the Rana Ghundai date, the chronology for the Kechi Beg Phase is underpinned by considerably more radiocarbon determinations (8). The Kechi Beg and Hakra Wares Phases are thought to be generally contemporary with one another. There has been a small amount of excavation at one Hartkra Ware site, Jalilpur (17,18), and there are so far no radiocarbon dates for this phase. All of the known Hakra Wares sites were founded on virgin soil, so there is no direct straitigraphic evidence for its relationship to the phases of Stage One or the earliest settlements described in the last chapter.

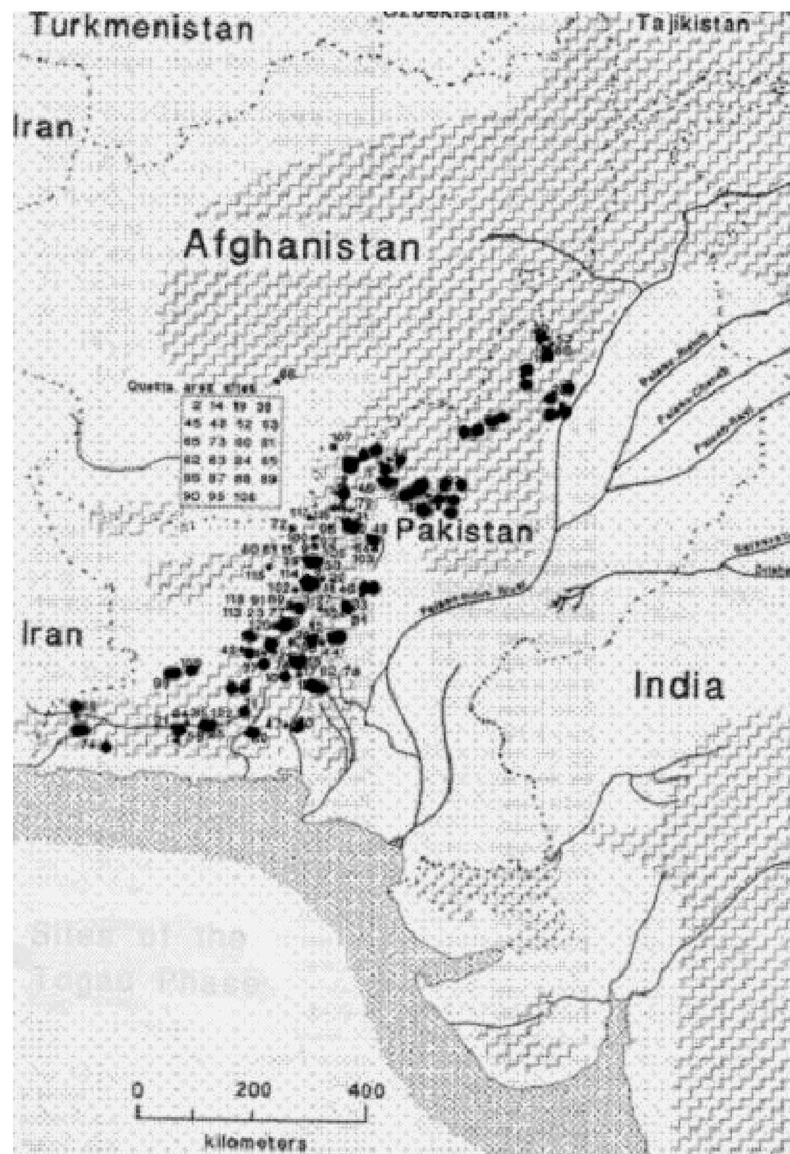
Given the archaeological evidence, hallmark of these three phases is the formation and spread of well-heeled farming societies in large parts of Pakistan. Three themes appear to characterize this stage: consolidation, continuity, and geographical expansion. There is increasing dependence on agriculture and domesticated animals for subsistence, an increasing complexity of culture is in evidence, potter's art develops to an astonishing level, and settlement sizes increase. In short, the trends set in motion by the early settlers in the Kachi plain and the fertile valleys of Baluchistan move forward and get consolidated. At the same time, population seems to be increasing and a considerable expansion of geographic expansion is noticeable. One of the most striking things about this stage of development is strengthening of the trade links with the Arabian Seacoast and with Central Asia that had already been established in the earlier stage. There is, however, no basic or radical change in technology, except perhaps, in the general area of tools to be useful in food production. It is certain that the knowledge of agriculture and the know-how about domestication of animals must have been improving throughout. This stage roughly covers the time period between 4,500 BC to 3,500 BC.

At this point, our interest no longer lies with various groups of hunters-gathers of Sindh and rudimentary agriculturist settlers in Baluchistan; it shifts to the growth of distinctly agricultural communities in the vast stretch of land within Baluchistan and the piedmont region of Gomal/Bannu on one hand and the adjoining area in Sindh on the other. As stated earlier, this area of growth eventually stretched as far as to Cholistan in southern Punjab, most likely covering the area in between. It is during this time that some major transformations take place in the Greater Indus Region. As importantly, it is in the course of this development that the roots of the subsequent Indus Civilization lie. In this chapter we shall examine the general dynamics of this developmental process and identify the geographic pockets for which specific archaeological evidence is available. In the next two chapters we shall follow the course of these settlements and witness the processes that lead to the rise of a unique urban civilization in this land, i.e. the Harappan Civilization.

Togau Phase: Togau Ware was first defined by Beatrice de Cardi after her 1948 exploration of the type site of Tagau, which has not yet been excavated. Togau is a large mound in the Chhappar Valley of Sarawan, 12 kilometer northwest of Kalat in Baluchistan. The Togau phase is confined to Baluchistan and eastern Afghanistan with some occasional spillover in the adjacent area of Bannu plains. Possehl also includes Walter Fairservis' Black-on-Red Ware from the later periods of Kili Gul Muhammad in this cultural phase. According to Possehl, there are eighty-four Togau phase sites so far discovered (8): some of them are

Village Farming Communities **!**Mundigak (Afghanistan) , Mehrgarh III, Miri, Periano Ghundai, Anjira, Sur Jangal, Surab, Rana Ghundai, Kili Gul Muhammad, all in Baluchistan, and Sheri Khan Terrace in Bannu plains.[a Kechi Beg occupation indicating]

in the
that new
entering the
of the



Map of Togau Phase sites (after Possehl**)**

Enough exploration has been done to indisettlement

cate a real sustained population growth over the previous Early Settlements, discussed in the last chapter. The Togau Phase is a clear indication of this continuity. It can be illustrated in a number of ways. For example, there is continuity of settlement

This is seen in the growth in the[392] at a large number of sites: of the thirty-three Basketmarked sites (see preceding chapter), twenty-eight of them also have a Togau occupation. Of the eighty-four Togau sites, sixty-seven also have a Kechi Beg occupation indicating considerable stability in the location of villages. The Togau phase is emerging as a key point in the cultural history of early Pakistan, its roots deeply planted in the life and tradition of the earliest settlements in the Khojak-Bolan stretch in northern Bakuchistan.



The Togau phase was also a time of innovation and change, with the possibility that new populations were entering the greater Indus region. Most of this information comes from Mehrgarh III, where there is a significant increase in the amount of craft activity and technological change. An analysis of the skeletons from a cemetery also indicates change in the biological constitution of the population. Thus, the Togau phase is a time of both continuity and innovation, about which there is much to be learnt.

When comparing settlement figures for the Togau phase with Basket-marked phase of the early settlements in Baluchistan, Possehl draws attention to some very significant differences. The estimate of settled area for Basket-marked phase was eightyfive hectares. In the Togau phase it is 295, a growth by a factor of 3.5. This is seen in the growth in the number of settlements, up from thirty-three to eighty-four, but also an increase of nearly a full hectares in average settlement size. The Togau phase is still a very long period, 700 years, and there is room for the multiplication of net settled area due to village shifting their settlement locations within this period of time, as well as other factors that confuse and confound the problems of estimating the size of prehistoric populations. Mehrgarh during the Togau phase (Period III) is *ca.* 75 hectares. This is out of line with what we know about other settlements in the region and may well reflect a process of lateral stratification at the site.

There is also continuity in architecture, especially at Mehrgarh, where both compartmented buildings and domestic structures like those of the Basket-marked occupation (Period II) continued to be built, although in a new location to the south of the early village. There is development in the potter’s art, with the ascendancy of fine, hard, wheelturned, red ware ceramics that continue to dominate the assemblages of the greater Indus region through the second millennium BC. There is also continuity in types, which is best documented by the seriation diagrams prepared by Walter Fairservis for his excavation at Kili Gul Muhammad and Damb Sadaat.

Excavation of Mehrgarh III provides the best insight into the culture of developed village farming communities of early Pakistan, but Sheri Khan Terakai in Bannu is also part of the Togau phase and represents one of the early mature forms of agricultural villages in the region. Sheri Khan Terakai is relatively large at twenty-one hectares, phase. There is evidence for craft specialization in metallurgy, bead making, and pottery. The artisans experimented with a wide variety of materials, some of which resulted from long distance trade. This reached from northern Afghanistan to the Arabian Sea. It appears that Mehrgarhwas a hub of this commerce during the Togau phase. A specialized kiln was found associated with the Togau phase at Mehrgarh, with six meters of deep, loosely stratified ash, broken kiln walls and wasters of over-fired pots. The pottery from the bottom to the top of this

deposit was found to be homogeneous, it is also evident that this thick deposit of stratified trash accumulated in a rather short span of time during

which
potters

worked intensively in this area. Growth is alsonaturalistic ungulates are found in Togau A. Togau B is a slight stylization of and there seems to be little lateral stratification
these
figures
seen
in
which
there.
provement of
curvilinear but still recognizable as
Togau Ware:
At the time of discovery de
other
crafts
and
animals. In Togau C, the bodies and
Cardi (19) found quantities of a fine, wheel-made
legs of the animals disappear and all
technology.
red ware bowls usually about twenty to twenty-fivethat remains are the Therehooks ofis their
cm in diameter, with a knife edge rim, slipped in red
not
much
horns, but the execution of the design is
more

and painted in black. The designs were usually still relatively precise. The Togau Din
placed inside the bowl at the rim and consisted of designs are sloppy hooks around the Period

small ungulates and stylized hooks. She saw a con
rim. This stylistic sequence may be an
III but now there

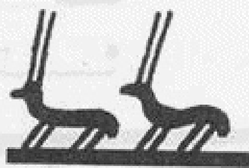
tinuum in this and arranged the designs in four is artistic development through time, as for
stages of evolution, designated Togau A to Togau D. indicated by de Cardi's excavation data refining

(20,21). Well rendered, rather naturalistic ungulates
from Siah Damb, with realistic animals
a n d p o s s i b l y
are found in Togau A. Togau B is a slight stylization
being the earliest. The pottery type has

smelting copper.
of these figures which are more curvilinear but still
been somewhat expanded by de Cardi
Testimony for this
recognizable as animals. In Togau C, the bodies
to include other forms and decorative
comes from a
and legs of the animals disappear and all that re
motifs but it is also coincident with Kili
building of do
mains are the hooks of their horns, but the execu

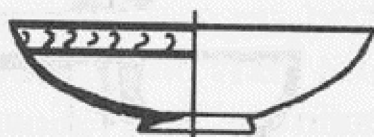
Gul Muhammad Black-on-Red ware as
mestic type with
tion of the design is still relatively precise. The To defined by Fairservis. walls which
gau D designs are sloppy hooks around the rim.

There are some broad cultural parallels
is open on the
theare immore
copper
Mehrgarh
evidence
melting,









Stylistic sequence for Togau A-D
(after de Cardi)

three

Stylistic sequence for Togau A-D (*after de Cardi*)

This stylistic sequence may be an artistic develop
between the Togau sites and Central
western side. The
ment through time, as indicated by de Cardi's exca
Asia, especially with Namazgah I and II. Some years ago Walter Fairservis also
floor and walls were burnt, and the excavation team
vation data from Siah Damb, with realistic animals
noted the similarities between the Togau ware and the ceramics from Chasma
believes that it was used as a firing structure. This
being
the
earliest.
The
pottery
type
has
been
Ali in northern Iran. Possehl see the Tagau Ware as an outgrowth of earlier building contained one
complete and thirteen bro
somewhat expanded by de Cardi to include other

trends in pyrotechnology and the nanipulation of clay, but it is not clear why ken crucibles with copper degs and stains. An im
forms and decorative motifs but it is also coincident
these developments should not be considered as some important aspects of
portant product of this new craft is an early example
with Kili Gul Muhammad Black-on-Red ware as de
technological unnovation. Similarly, Fairservis connects the developments in pottery-making to
northern Iran, implying theof a pin with double spiral head. Three compart
fined by Fairservis (22). There are some broad cul
Tagau phase as an outgrowth of mented seals were found at Mehrgarh III along with
tural parallels between the Togau sites and Central
Chasma Ali. Again, it is not clear why, in view of the vast area and a prolonged
unidentifiable fragments of the metal and one tubu
Asia, especially with Namazgah I and II. Some
time period, covered by Tagau phase, Chashma Ali culture should not be considered as a reflection of Tagau culture.
lar gold bead is also associated with this period. years ago Walter Fairservis also noted the similariOverall, copper is rare in Togau phase and ties between the Togau ware and the ceramics from

Craft Activities: There was a significant expansion of craft activities at
Mehrgarh in Togau phase. There is evidence for craft Mehrgarh is the only site where direct evidence for
Chasma Ali in northern Iran. smelting, refining or melting the metal has been specialization in
Possehl see the Tagau Ware as an out
metallurgy, bead making, and pottery. The artisans experimented with a wide found.variety of materials, some of which resulted from long distance trade. This growth of earlier trends in pyrotechnology and the A surface survey of the Mehrgarh III settle manipulation of clay, but it is not clear why these
reached from northern Afghanistan to the Arabian Sea. It appears that Mehrgarh
ment area revealed considerable evidence for craft

developments should not be considered as some important aspects of technological unnovation. Similarly, Fairservis connects the developments in pottery-making to northern Iran, implying the Tagau phase as an outgrowth of Chasma Ali. Again, it is not clear why, in view of the vast area and a pro longed time period, covered by Tagau phase, Chashma Ali culture should not be considered as a reflection of Tagau culture.

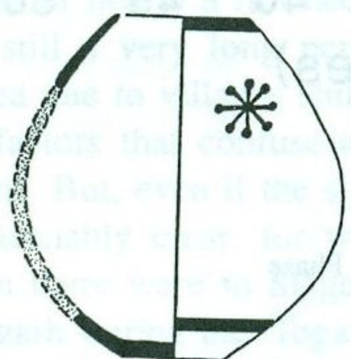
Craft Activities: There was a significant ex pansion of craft activities at Mehrgarh in Togau
activity involving the manipulation of lapis lazuli, carnelian, calcite, garnet, turquoise, shell and bitumen. Microdrill in phtanite, several shell pieces, some bone awls, grinding stones, pestles, and flint tools were recorded.The drills are a well-known type and have been found at other sites, including Shahr-e-Sokhta in north-eastern Iran, Mundigak in southern Afghanistan, Amri and Ghazi Shah in lower Sind. This bead drilling technology was shared over a vast area, which begins in the

Togau phase and persists through the Mature Harappan

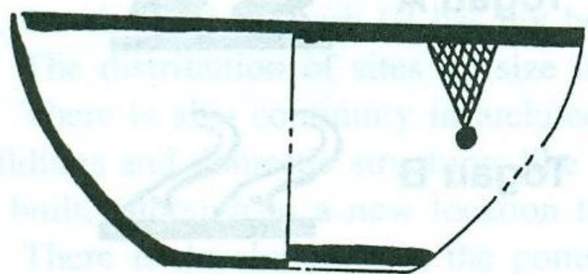








0 10 cm







0 10 cm

scales for complete vessels

period. It might be that the spatial distribution indicates a perview of a relatively small number of specialists, who traveled among sites, sometimes establishing permanent residence at one place. Steatite paste was used for making beads at Mehrgarh at this time and the excavations have yielded an insight into how this material was handled. It first heated, causing stone to become malleable. The craftsmen then squeezed it through a metal tube, slicing off a thin wafer bead. A shell industry using conch shellscontinues from Period II contexts, well into Period III

Village Farming Communities**!**when it acquires some additional momemtum.

Evidence for craft activity is not as impressive at Sheri Khan Tarakai in Bannu, an mportant Towas

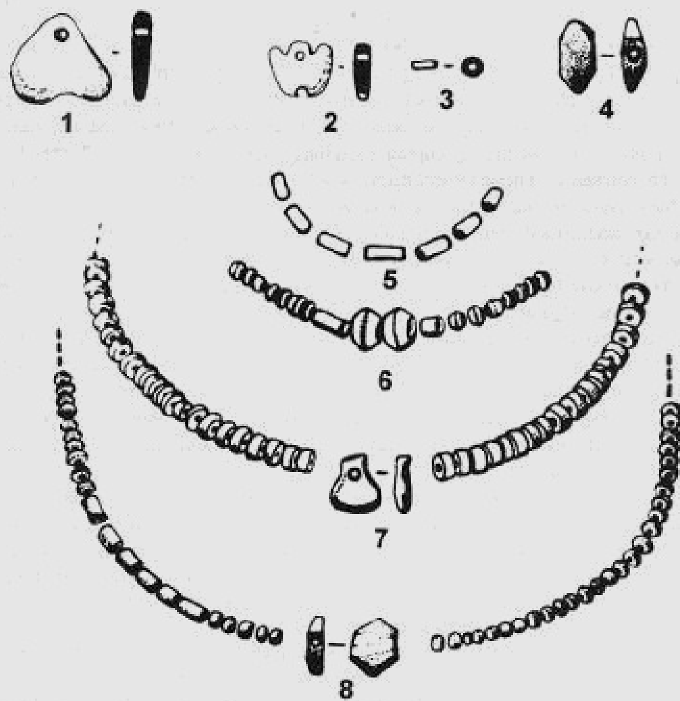
the

It is worth noting that many, even most, of the technologies that one associates with Indus Civilization were put in place during the Togau phase, which began 2,000 years before the first emergence of urbanization in Pakistan. There were changes and growth, the development of bronze, the manufacture of stoneware

drilling
of
Black-on-Red slipcarneliangau site, but it was certainly
very
long beads, butmuch **from Kili Gul Mu**
technology is a reflection of growth and development in existing ideas, of**hammad III, Togau**
technologies put in place by the peoples of the Togau phase. **Phase (**after Fairservis**)**

of thisthere, including bead making, using many of the same materials reported from Mehrgarh III. Mundi The architecture of Mehrgarh III is based in Period II, domesticgak, near Kandhar, is anstructures and compartmented structures, thought to be storage units, even other important Togau site

gran aries,
social might be
distance trade. had
be



Ornaments from Mehrgarh III, Togau phase

(after Samzun and Sellier)

Ornaments from Mehrgarh III, MR2 cemetery, Togau

Mehrgarh is
the only site known from this period so far, that has produced a building that would have been anything other than a domestic facility.

The only Togau site with human remains is Mehrgarh III where 125
human interments were found in an area reserved as a cemetery; of these ninety
Phase (*after Samzun and Sellier***)**

394 which was founded at this time. There is no particular evidence for craft activity there, but Mundigak would mature into an important settlement of the borders of the Mature Harappan.It is worth noting that many, even most, of the technologies that one associates with Indus Civilization were put in place during the Togau phase, which began 2,000 years before the first emergence of urbanization in Pakistan. There were changes and growth, Th.e development of bronze, the manufacture of stoneware bangles and the drilling of very long carnelian beads, but much of this technology is a reflection of growth and development in existing ideas, of technologies put in place by the peoples of the Togau phase.

Architecture: The architecture of Mehrgarh III is based in Period II, domestic structures and compartmented structures, thought to be storage units, even specifically granaries, continued to be built. They were now separated from one another, however. The storage buildings had complex plans, the product of a community with a well developed social organization that may be indicative of a redistribution system. A relatively marked degree of social differenciation might be indicated by the scale and complexity of craft activities and long distance trade. Architecture at other sites seems to have been less elaborate, based on mud and mud-brick, often with stone foundations. Mehrgarh is the

only site known from this period so far, that has produced a building that would have been anything other than a domestic facility.

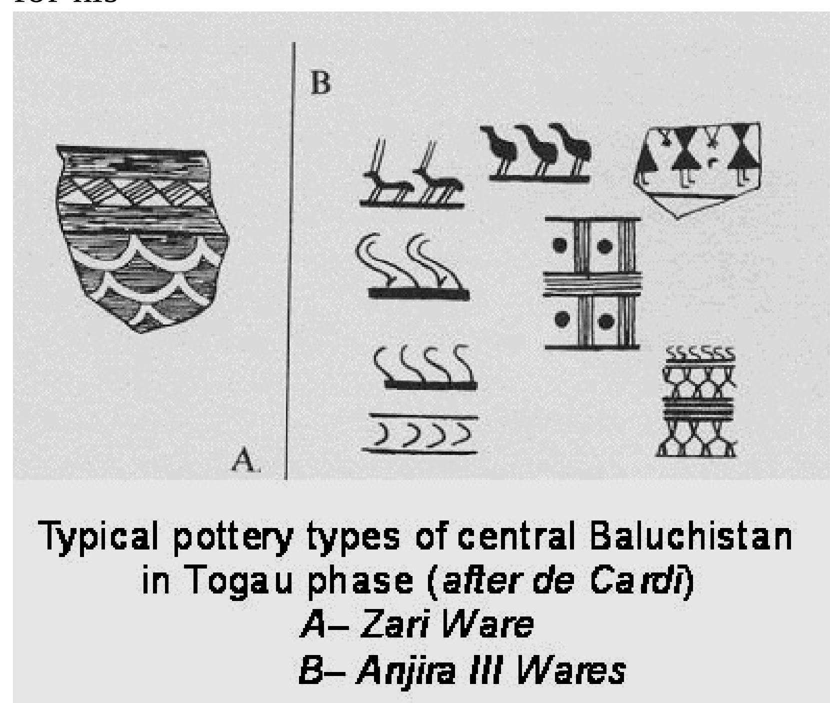
Burials: The only Togau site with human remains is Mehrgarh III where 125 human interments were found in an area reserved as a cemetery; of these ninety- nine were excavated. There is a change in the burial customs at Mehrgarh at this time. Gone are the grave structures of Period I and II (Chapter 4) and the practice of using red ochre in a lavish way was discontinued. There are also burials arranged in a way that suggests collective graves. These were aligned in an east-west orientation, with the head always to the east, lying on their side in a flexed position. Disarticulated, secondary inhumations were also found, some with the skull set on a brick.

one in mented copper seal was found with an adult and pottery found in only three graves. Other skeletons had necklaces or pendants made of lapis lazuli, turquoise, carnelian, and chrysoprase. Steatite beads were the most common ornament. The grave goods are not spectacular, but there is an indication that mature females took more with them to the grave than did mature males and immature humans of both sexes. This has been taken as a pointer to the female dominated society.

Kechi Beg Phase: Kechi Beg, along with the Hakra Wares, is a later phase of the stage of developed village farming communities and pastoral societies. It represents continued ontological Dentalum shells were found in two graves, a child's burial. A fragmentary compart

to the south of the early village. There is development in the potter's art, with the ascendancy of fine, hard, wheel-turned, red ware ceramics that continue to dominate the assemblages of the greater Indus region through the second

types, which is
by the
for his



Typical pottery types of central Baluchistan in Togau phase (*after de Cardi*)
A– Zari Ware
B– Anjira III Wares

Kili GulVillage Farming Communities**!**
! The drills are a well-known type and have been found at other sites, including Mehrgarh III Shahr-e-Sokhta in north-eastern Iran, Mindigak in southern Afghanistan, Amri

and Ghazi Shah in lower Sind. This bead drilling technology was shared over a vast area, which begins in the Togau phase and persists through the Mature

Harappan period. It might be that the spatial distribution indicates a perview of a
of early relatively small number of specialists, who traveled among sites, sometimes
Sheri Khan
permanent
Typical pottery types of central Baluchistan in Togau Early Settlements**!Phase. A- Zari; B- Angira III (***after de Card***i)**

growth with consolidation, rather than perceptible development of technology. This phase also marks the beginnings of regionalism in the Indus Age. According to Possehl, there are 256 sites attributed to the contemporaneous Kechi/Hakra phases of which Kechi Beg sites account for 153 settlements. The important theme for the Kechi Beg site data seems to be a growth in the number of settlements, not settlement size. This is especially true when the Hakra Wares phase sites are added since there are 103 of these, bringing the total known settlements to 256 from only eighty-four Togau phase sites. This is, once again, growth by a factor of three. Three representative sites of the Kechi Beg phase have been selected here for short description, beginning

wheel-made red ware; bowls usually about twenty to twenty-five cm in diameter,of the cylinderturquoise, carnelian, and chrysoprase. Steatite beads were the most common
splitting. The presence of this tusk and some elephant bones in Period I as well
with the type site itself.
Kechi Beg: Kechi Beg is a small low mound
as in Period II indicates the start of ivory crafts that played a very important roleVillage Farming Communities**!**about half distance between Damb Sadaat and
in the Indus Civilization a few thousand years after.
Quetta City, just to the west of the Bolan Highway. practice of using red ochre in a lavish way was discontinued. There are also
one of the early mature forms of the village farming community. The expansion Kechi Beg was excavated by Walter Fairservis as a
of Mehrgarh to the vicinity of seventy hectares may raise some questions of
A cylinder bead in terra cotta was found in one of the compartmented buildings
burials arranged in a way that suggests collective graves. These were aligned in
part of the Second Afghan Expedition from the
time
and
the
an east-west orientation, with the head always to the east, lying on their side in aAmerican Museum of Natural History in 1951. The
lateral stratigraphy but it is not impossible that all of the settlement was occupied of Period II. When rolled out, this bead produced an impression much like thatflexed position. Disarticulated, secondary inhumations were also found, somesite had a single period of occupation during the
at one time. Sheri Khan Terakai is relatively large at twenty-one hectares, and this
was handled. It
of a cylinder seal. The motif is regular and portrays vegetation. Jarrige, MeadowKechi Beg phase,

which was also found at Kili Gul and Quivron have drawn attention to the fact that similar bead seals are also
Muhammad, Period IV and Damb Sadaat, Period I. Dentalum shells were found in two graves, one in a child's burial. A fragmentary known in western Iran in an early context and the
There were two building levels at Kechi Beg but,
compartmented copper seal was found with an adult and pottery found in only
At the time of discovery de Cardi found quantities of a fine, given the limited exposure, little can be said of the
to
become
bead from Mehrgarh could be considered as an
three graves. Other skeletons had necklaces or pendants made of lapis lazuli,
meaning of the architecture that was found. Kechi

Beg is a good example of a small, single compowith a knife edge rim, slipped in red and painted in black. The designs were early prototype seal that later ornament. The grave goods are not spectacular, but there is an indication that became popular in Mesopotamia. Other finds in nent settlement in the uplands of Baluchistan. It mature females took more with them to the grave than did mature males and offers a contrast in settlement practices if compared usually placed inside the bowl at the rim and consisted of small ungulates andMehrgarh II include violin shaped human figures of to places like the Quetta Miri,Damb Sadaat and Kili

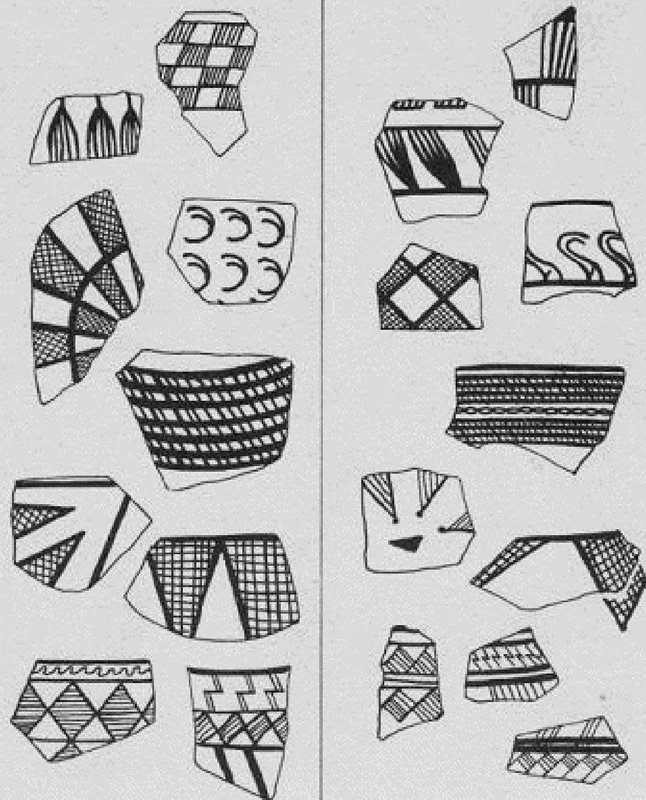
immature humans of both sexes. This has been taken as a pointer to the female stylized hooks. She saw a continuum in this and arranged the designs in four dominated society.

unbaked clay colored with red ochre, animal stages of evolution, designated Togau A to Togau D. Well rendered, ratherusing conch
continues from figurines, grinding stones, mortars, stone bowls,
and hundreds of chipped stone tools. JustKechi Beg Phaselike

Page 208
Period I, many bone tools were found, most of them Kechi Beg, along with
additional



points with lustrous polish. Patrick Vaughn found a
later phase of the stage
number of chipped tools in association with red ochre. This is an interesting



Typological similarities of painted pottery designs found in northern Iran (Chasma Ali) and in Baluchistan, Togau phase

(after Fairservis)

of

developed village

Comparison of Togau Phase pottery with that of Chasm observation since ochre may be used for the tanning of hides.

Ali across the border in Iran

farming communities

and pastoral societies.

A ring, a bead of copper and a small copper ingot appear in an early level of

at Tarakai in an important but it was certainly there, including bead making, using many of the same materials reported from Mehrgarh III. Mundigak, near Kandhar, is another important Togau site which was founded at this time. There is no particular evidence for craft activity there, but Mundigak would mature into an important settlement of

It represents continued Period IIb, but otherwise the lithic ontological growth

with consolidation,and bone-tool kit of the earlier rather than perceptible period continue to be in use. Two development of complete sickles with inset technology. This phase tools, an ivory tusk,also marks microlithicthe

beginningslumpsofof red ochre and grinding regionalism in the stones have been found. Graves have Indus

Age. According

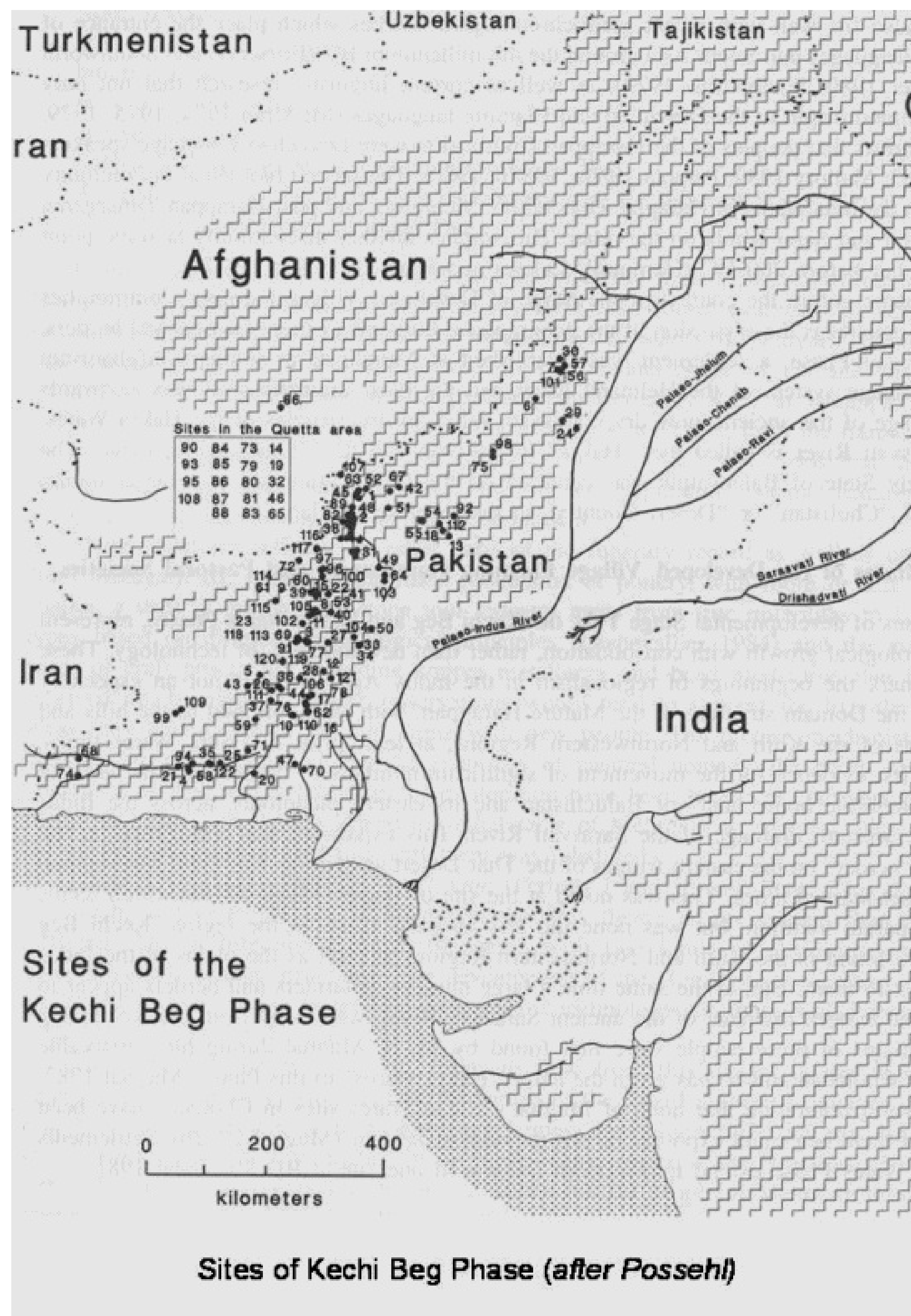
been mentioned but the details seem to Possehl, there are to be missing. Cotton occurs in this 256 sites attributed to



Painted sherd with stylized bull motif, Mehrgarh III.

the contemporaneousperiod. Wheel made pottery begins Kechi/Hakra phases of to appear along with handmade ones

Painted sherd from Mehrgarh III, Togau Phase, with stylized bull motif in Period IIC.



Map of Kechi Beg Phase sites (*after Possehl***)** Page 213

Pottery: Bitumen or asphalt covered baskets were found in Period I. Some had been used in the preparation of the[395]
earliest ceramics at Mehrgarh. Further thoughts on this came to light in the course of the study of Period II remains. Asphalt or bitumen probably came from

Village Farming Communities! In Search of Cultural Sequence
Gul Muhammad. The annual pulse of transhuman Beg ceramics, along with the related Zari Ware.

movement between the Indus plains and Baluchis A large number of terracotta cones with a carefully made hole in one end, which

tan is suggested by these remains. Basket-marked Ware and Togau, and the introduc*Anjira:*
The mound of Anjira in the Surab

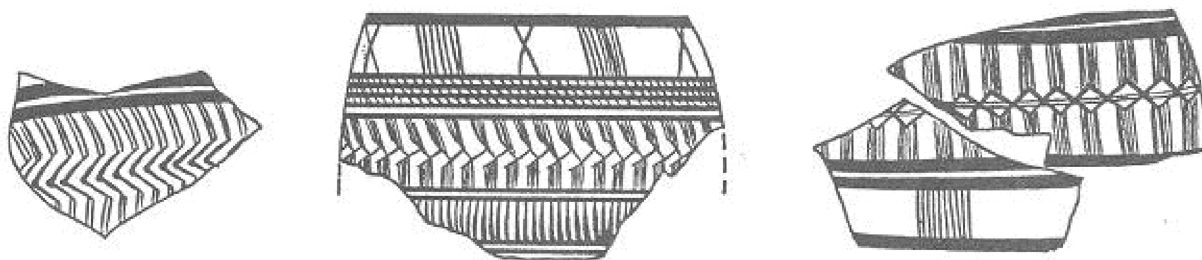
does not go all the way through, were recovered from Sheri Khan Tarakai.

tion of the important Nal ceramic, especially as it is

area of Kalat is a three hectare mound with five pe Although the function of these objects is not known, the excavators note that riods of occupation. It was excavated in 1957 by phase is also represented at Siah Damb nearby. Beatrice de Cardi, with the support of the Royalthese objects have parallels to the north. Three small terracotta objects thought

Asiatic Society. She discovered the site, along with
Togau, during her 1947/48 survey in the region. The mad IV. Damb Sadaat I, and Siah Damb II, in Surab

district.possibly to have been boat models were found. These fall just short of being
completely convincing as boat models, but are extremely interesting objects.



Jungal painted pottery from Rana Ghundai, Kechi Beg phase
(*after Fairservis*)

Village Farming Communities

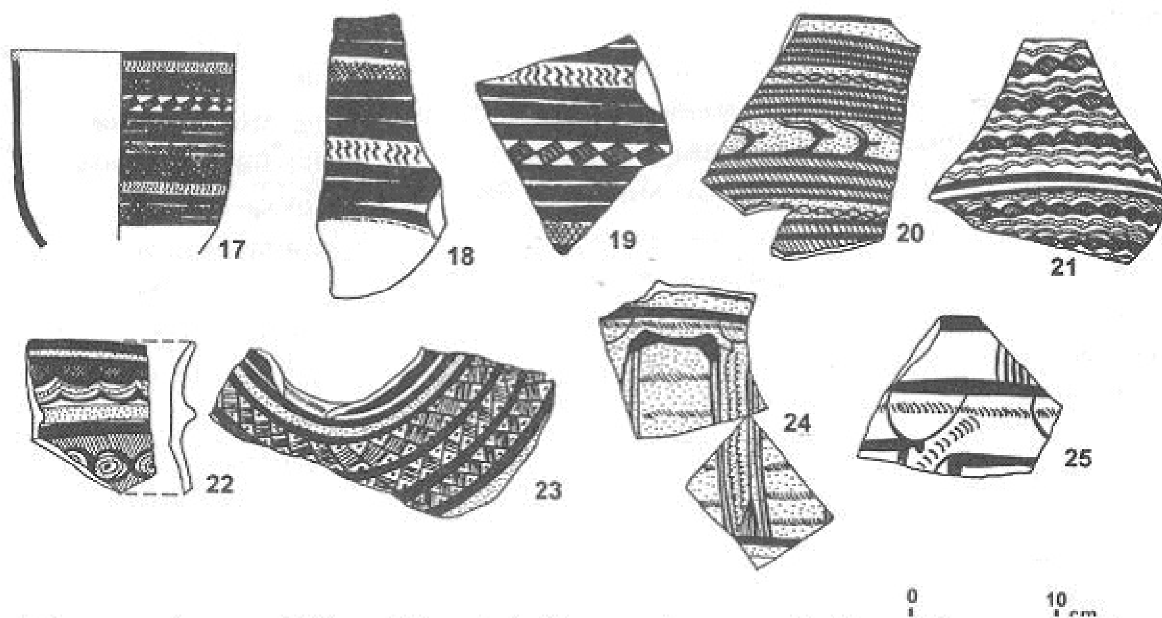
Jangal painted pottery from Rana Ghundai, Kechi Beg Phase (!*after Fairservis*)
Jungal painted pottery from Rana Ghundai, Kechi Beg Phase (*after Fairservis)*

which Kechi Beg sites account for 153 settlements. The important theme for the Period I belongs to the Basket-marked phase and is Terracotta bangles, always in a crude fabric with a red slip were found but were
Kechi Beg site data seems to be a growth in the number of settlements, not

nomads of the Early Settlements period (Chapter Bannu Archaeological Project, a cooperative ven

settlement size. This is especially true when the Hakra Wares phase sites are hammad II as well as Mehrgarh II. Period II generA large number of beads, in a variety of colorful stone, including lapis lazuli,
added since there are 103 of these, bringing the total known settlements to 256 architecture comes from the use of rounded boulturquoise and limestone, was found at Sheri Khan Tarakai. These stones, and the from only eighty-four Togau phase sites. This is, once again, growth by a factor brick. Period III is a complex occupation with Kechioccurrence of shell fragments, are indicative of the wide contacts of the ancient of three. Three representative sites of the Kechi Beg phase have been selected inhabitants of Sheri Khan Tarakai. Twenty-three bone tools have been reported;
these include awls, points, spatulas and a rectangular object that has been carefully perforated. A large number of querns and other ground stone food processing tools was there. Ring stones, axes and small palettes were also found. The chipped stone tools from Sheri Khan Tarakai form a rich and varied collection. This is basically an undistinguishable flake tool making tradition, lacking in true microlithic types. The faunal remains from Sheri Khan Tarakai are in a very fragile state and have not been completely analyzed. They include examples of zebu, sheep, goat and water buffalo.

Hakra Ware Phase



Ceramics of the Kechi Beg phase (after Possehl)

Hakra Ware phase is confined to the Bhawalpur area of the Cholistan Desert. The area is bordered on the north by the Sutlej River, and on northwest and west Ceramics of Kechi Beg Phase (*after Possehl*) by the Indus. In the east, its natural boundary is the Thar Desert. The western

fringes of the Thar Desert are clearly defined by the riverbed of Hakra River, here for short description, beginning with the type site itself.

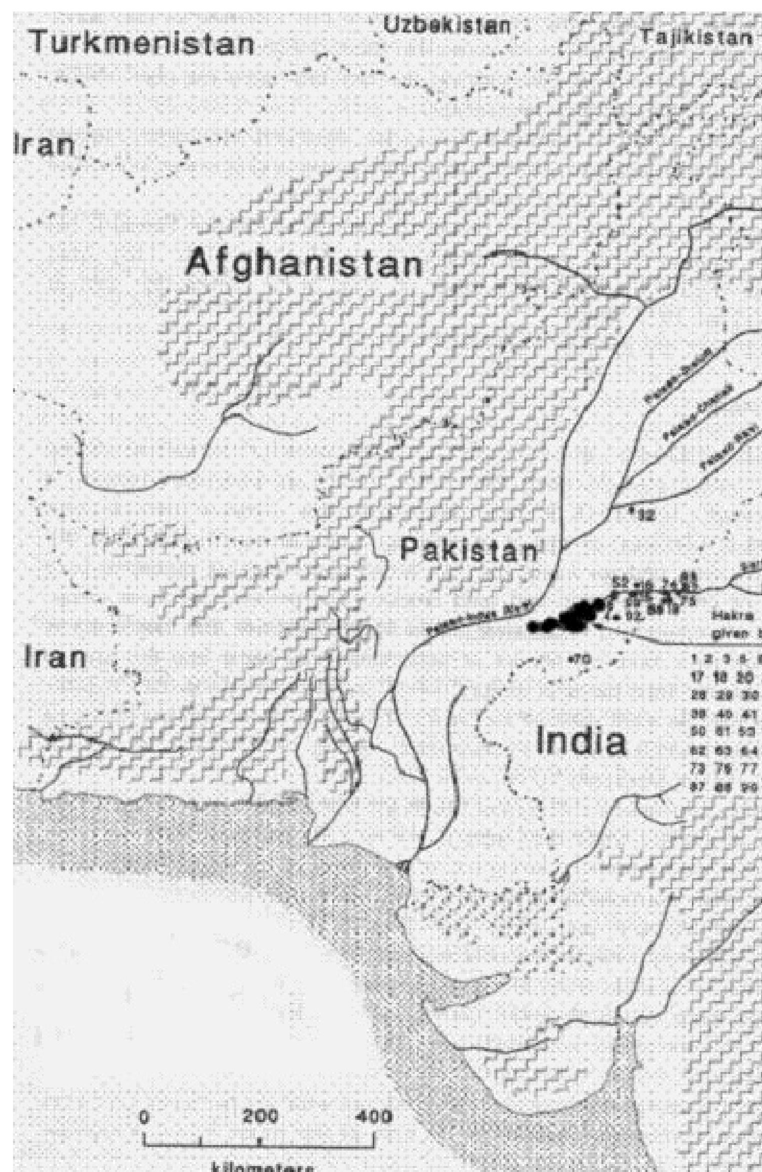
sion and the whole issue is up in the air. Two structures were located: one is a simple, curving line of stones set in place, the other is part of a rectilinear structure with what might be attached wall or part of a second room. The pottery of Shei Khan Tarakai has a few parallel with surrounding areas. The excavators see correlates with Periano Ghundai in the beginning of a new era in the evolution of the civilization. Two distinct aspects, the sedentary and the pastoral nomadic lifestyle seem to have emerged and prevailed in its local/regional character. The sedentary aspect of Indus tradition Hakra

Village Farming Communities !can be seen in the Ravi phase in Punjab Plains (53), in Cholistan (54) in Gomal Plain at Sheri khan Waziristan as well as Jalilpur and Hakra Wares ofalso called the 'Hakra Depression'. The climate of Cholistan is arid, annual Tarok (55)., and in southwestern Sindh at Amri and Bhawalpur, which makes good sense because the Balakot (56). The Pastoral nomadic lifestyle is average rainfall is not more than 6 inches. However, even a meager rainfall, as in

Hakra Wares sites are contemporary with the Kechi greatly found in Thar Desert region (57,58)**.** In this
Beg phase. Sheri Khan Tarakai produced a rich and
present times, is sufficient to support an un-estimated but large number of
phenomenon, most importantly, the settlements lo
wide range of artifacts, most in terracotta, but ineconomically valuable herds of camel, cattle, goats and sheep, subsisting entirelycated close to the bordering area of Sindh- Kohistan cluded bone and stone. No metal is in evidence.
may carry a strong influence from Iran.
on desert plants and rain water collected in community ponds called *tobas*. When
A large collection of terracotta figurines of
the *tobas* dry up, the nomads are
both humans and cattle was found at Sheri Khan
Tarakai. The humans are all highly stylized and areobliged to move close to the
recognizable type for the region at the time. Twopermanent village settlements.
general types emerge from the collection. The firstThey wait there until thehas no shoulders and a stem-like body, usually withThea pinched face and appliqué breasts. The other typerains return.
has a bottle like torso with shoulders and reducednomads exchange their products
arms. The bull figurines from Sheri Khan Tarakai aremanufactured goods and
not remarkable, but document the participation ofandthe inhabitants of the site in this tradition.A largegrain in towns
number of terracotta cones with a carefully madevillages. Thus, although both
hole in one end, which does not go all the way settled and nomadic
through, were recovered from Sheri Khan Terakai is

not known, the excavators note that these objects populations exist independently,
have parallels to the north. Three small terracottaeach group utilizing a different
objects thought possibly to have been boat models niche, they are
were found. These fall just short of being completely economically

convincing as boat models, but are extremely inter
and therefore constituteesting objects. Jungal painted pottery from Rana
Ghundai, Kechi Beg Phaseessential Terracotta bangles, alof theways in a crude fabric with a red slip were found butwell-knit and viable
were not common. This is in contrast to other Kechi
Beg sites in this region. social and economic system of
the region. The A large number of beads, in a variety ofpresent-day
colorful stone, including lapis lazuli, turquoise and
analogy can be projected back
limestone, was found at Sheri Khan Tarakai. These
stones, and the occurrence of shell fragments, areinto the prehistoric past because
indicative of the wide contacts of the ancient inhabiconvincing archaeological
tants of Sheri Khan Tarakai. Twenty-three boneevidence for such an interactiontools have been reported; these include awls, has been discovered in points, spatulas and a rectangular object that has Cholistan and elsewhere,been carefully perforated.
A large number of querns
and other ground stone food processing tools was
especially in Basluchistan.
there. Ring stones, axes and small palettes were
also found. The chipped stone tools from SheriAs an introduction to the detail
monsoon
for
food
the
ecological
interdependent
components
larger,



Hakra Ware Settlements **(after Possehl)**

Map of Hakra Warte sites *(after Possehl)***)**

Khan Tarakai form a rich and varied collection. This In the cultural assemblage, pottery is the
is basically an undistinguishable flake tool making
that follows, it should be pointed out that the original pattern of domestic
most diagnostic and widely spread cultural element for recognition. The pottery is generally handmade,
tradition, lacking in true microlithic types. The faunal
settlements and other types of sites in most of Cholistan has largely remained
coarse with simple painted incised wavy decora
remains from Sheri Khan Tarakai are in a very fragintact because economic development in the region has been slow. Difficulties of
ile state and have not been completely analyzed. tions or cord impressed motifs. A major sedentary
They include examples of zebu, sheep, goat and
developing the desert extensively have saved the ancient sites from destruction.
cluster was recorded in Cholistan where 99 sites
water buffalo. At the same time the drift sand has advanced 20 to 25 miles westward from thehave been recorded (54). During the Ravi phase at

Hakra Ware Phase: The
blage is recently emerging as a
Hakra assem
distinct phase
Harappa, the profusely decorated pottery along with several other artifacts are reported (53) and Ke

based on the ceramic assemblage and is catego
rized as one of the nascent phases of the early In
dus period. The available evidence of Hakra as
semblage during the early Indus tradition indicates
noyer (59) mentions "the Ravi phase pottery is quite

distinct from pottery found at sites to the southwest such as Mehrgarh, but it has some similarities to pottery found at sites in the Sulaiman range to the

beneath the old and somewhat stabilized reddish-brown sand dunes, where they represent temporary occupations as indicated by scatters of potsherds. Associated microliths also occur on these campsites. Such campsites occur seven
west, and many more similarities to pottery in theto eighteen kilometers to the south and southwest of Derawar. On the basis ofdependently, each group utilizing a different eco

Ghaggar-Hakra river valley region to the east". The
logical niche, they are interdependent economically

probably inhabited them more than not. It is significant that of the total number

Ravi pottery is refined, mass produced on the wheel

archaeological evidence, it seems that during the fourth millennium BC the Thar

and therefore constitute essential components of

and more elaborately decorated sometimes withof sites, 52 percent represent campsites. Mughal suggests that most of thethe larger, well-knit and viable social and economic

graffiti. system of the region. The present-day analogy can Hakra
Ware
phase
is
confined

to
the

population lived nomadic or semi-nomadic life during the fourth millennium BC

be projected back into the prehistoric past because

Bhawalpur area of the Cholistan Desert., which is in Cholistan. This would suggest the existence of a desert environment with convincing archaeological evidence for such an in essentially an extension of the great Thar Desert, Of the 103 Hakra Wares sites, fifty-four can be classified as camps used byteraction has been discovered in Cholistan and

which geographically separates Pakistan from India.

plentiful vegetation and moisture for its effective utilization for raising cattle,

elsewhere, especially in Basluchistan.

These settlements, though far from the hilly Balupastoralists, leaving forty-nine village farming communities. Campsites are

chistan,

goats and sheep alongside the fertile flood plain for permanent human As an introduction to the detail that follows, represented by a light scatter of pottery without a buildup of an archaeological it should be pointed out that the original pattern of settlements.

domestic settlements and other types of sites in

midden. These settlements were located on the

most of Cholistan has largely remained intact be

Permanent Villages:

cause economic development in the region has

The sites are generally located on or close to the former

old alluvium of Cholistan as well as in stabilized

been slow. Difficulties of developing the desert ex

flood plain of the Hakra River all along its 300 miles long course in Bhawalpur areas. Mughal notes that sometensively have saved the ancient sites from destrucsandy sites,

tion. At the same time the drift sand has advanced

region. The highest concentration is noticeable around Derawar, where the perhaps many, got buried under moving dunes,

20 to 25 miles westward from theoriginal desert line

Hakra formed a playa like that of the Helmand River in Siestan. The Derawarand has buried an uncertain number of small sites
or have been significantly altered or erased by
under it.wind and sand erosion. The presence of thesearea, having been fed by a channel from the Sutlej remained habitable for a veryHakra Ware phase marks the beginning of
long time from at least the fourth to the second millennia BC as archaeologicalregional archaeological assemblages in the greater

Indus region. As stated before, Hakra Ware phase

evidence demonstrates. Near the flood plain of the river, certain sites stand to the

is approximately contemporary to Kechi Beg phase, that is between 4,000 BC to almost 3,000 BC.

maximum height of 53 feet today in spite of their deflation caused by erosive

There are 103 Hakra Ware sites, only one (Jalilpur

windstorms over the centuries. Such sites represent prolonged occupation, oftenabodes of pastoralists who came into this area to) of which has been excavated. The Hakra Ware

consists of an entire assemblage of different pottery

representing more than one cultural horizons. Ancient sites in Cholistan cannot It might even have been

types. This is best described by Mughal. A close

that some of the inhabitants of Sind came there,

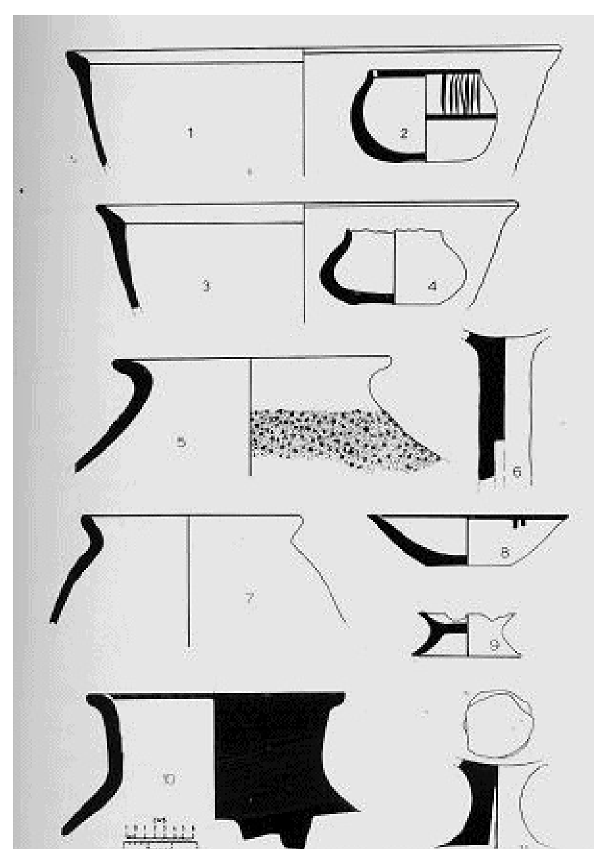
be missed even if half buried in the sand because of their deep reddish brown look at this assemblage shows that the historical

roots of the ceramics go back at Mehrgarh, Kili Gul

color as a result of millions of potsherds lying exposed on their surfaces.planted a food grain crop and waited for its

Muhammad and other sites in Baluchistan. For example, there is a small amount of basket-marked

harvest while they were in the area grazing their A large number of permanent villageanimals. This scenario is quite possible as thesites, with a buildup of stratigraphy and
Pottery of Hakra Ware Phase from pastoralists of the Thal desert in Khoshab and the formation of archaeological mounds



Pottery of Hakra Ware period, Cholistan (*after Mughal*)

Mianwali districts routinely practice such a part are present in Cholistan during Hakra time agriculture even today in Punjab. Wareelements that are quite similar

to those of Baluchistimes. The existence of mounds
tan, showing a strong affinity between the two peoThe campsites of the Hakra
Ware, like the permanent settlements, occur on the ples. indicate the probable
presence of mud and mudalluvial plain where amidst scatters of potsherds and microliths, the pottery with
Sutlej River, and on northwest and west by the In of
sedentism that was not apparent at the are in evidence. Superficial evidence points
to demarcations that Desert. The western fringes of the Thar Desert are could
have been mud walls for making off living quarters. Thus, the pastoral clearly
defined by the riverbed of Hakra River,alsocamp sites. The full stability of these
kinds called the 'Hakra Depression'. The climate of Choof villages is not known
but one shouldcampsites in Cholistan were qualitatively different from those in
Baluchistan listan is arid, annual average rainfall is not more during the same
time period. Here, the camps are more or less permanent or assume that
everyonethan 6 inches. However, even a meager rainfall, as who lived there, in
present times, is sufficient to support an unWide shouldered black-slipped vessel
of Hakra lived permanently year round. The other semi-permanent to which the
pastoral nomads returned season after seasons and

Ware Phase (after Mughal**)**

estimated but large number of economically valu
able herds of camel, cattle, goats and sheep, sub

category of Hakra Ware sites
settlements
are



Wide shouldered black slipped vessel of Hakra Ware period (*after Mughal*)

sisting entirely on desert plants and rain water colpottery, Hakra Mud Applique type seems to have

lected in community ponds calledrepresenting *tobas*. When the moundsPage 220parallels in early Amri period, and a parallel of black *tobas* dry up, the nomads are obliged to move closevarying size and heights and which are located in the alluvial flats or on the edgeto the permanent village settlements. They wait This pattern of parallelism in artifactual af

there until the monsoon rains return. The nomads

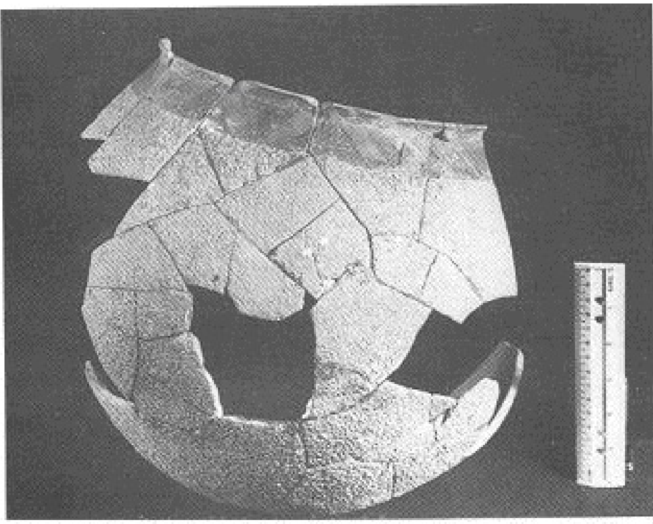
of low sand deposits. Such sites show prolonged occupation with a variety of

finities is important in defining the regional connec
exchange their products for manufactured goods
tion of the Cholistan area with the the surrounding

cultural materials in addition to the diagnostic Hakra Ware and microlith. It is onand food grain in towns and villages. Thus, although lands. It is meaningful to note that while the Hakra

both the settled and nomadic populations exist inware has its parallel in the far-away Baluchistan, it seems to have no relationship with the land just East of it. This evidence again shows the internal cohesion of ancient Pakistan and a general estrangement from the areas East of the current borders for obvious geographic reasons.

Microlithic tools are typically abundant on Village Farming CommunitiesHakra Ware sites, especially the pastoral camps.
appeared in
although a



Hakra appliqué globular vessel of thin body with short rim, painted on neck in black (*after Mughal*)

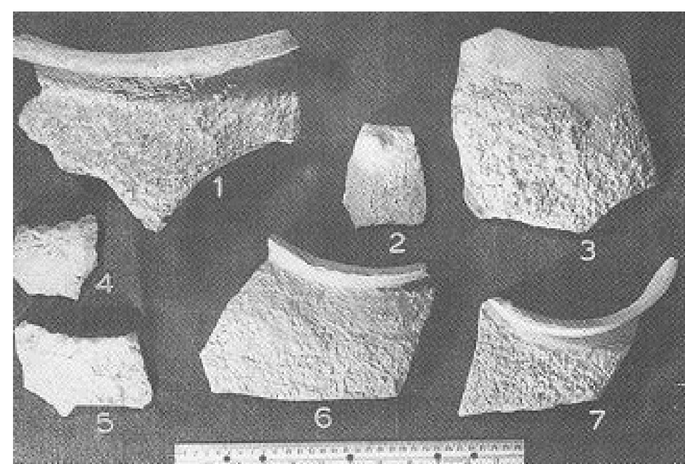
mid-fourth Hakra appliqué globular vessel of thin body with short rim, painted on neck in black (*after Mughal*)



Complete vessel of the Hakra incised pottery (*after Mughal*)

A complete vessel of the Hakra incised pottery (*after Mughal*)

Mughal has



Hakra appliqué pottery (*after Mughal*)

a brief Hakra appliqué pottery sherds (*after Mughal)*

Mughal also collected bits and pieces of copper, beads of shell, stone mace heads or ring stones, unworked carnelian, pestles along with terracotta animal figurines, bangles and beads. No building or room plans emerged from the limited excavation at Jalilpur I but the use of mud brick and earthen floors can be attested there.

Hakra Ware Pastoral Camps: The Hakra Wares sites are located on and beneath the old and somewhat stabilized reddish-brown sand dunes, where they represent temporary occupations as indicated by scatters of potsherds. Associated microliths also occur on these campsites. Such campsites occur seven to eighteen kilometers to the south and southwest of Derawar. On the basis of archaeological evidence, it seems that during the fourth millennium BC the Thar Desert most probably extended close to where Derawar Fort stands at present and that most of the population lived as pastoral nomads.

Of the 103 Hakra Wares sites, fifty-four can be classified as camps used by pastoralists, leaving forty-nine village farming communities. Campsites are represented by a light scatter of pottery without a buildup of an archaeological midden. These settlements were located on the old alluvium of Cholistan as well as in stabilized sandy areas. Mughal notes that some sites, perhaps many, got buried under moving dunes, or have been significantly altered or erased by wind and sand erosion. The presence of these camps testifies to the importance of pastoralism in the time of the Hakra Ware in that they seem to represent the relatively long term monsoon abodes of pastoralists who came into this area to maintain their animals. It might even have been that some of the inhabitants of Sind came there, planted a food grain crop and waited for its harvest while they were in the area grazing their animals. This scenario is quite possible as the pastoralists of the Thal desert in Khoshab and Mianwali districts routinely practice such a part time agriculture even today in Punjab.

The campsites of the Hakra Ware, like the permanent settlements, occur on the alluvial plain where amidst scatters of potsherds and microliths, the pottery with pots *in situ* are in evidence. Superficial evidence points to demarcations that could have been mud walls for making off living quarters. Thus, the pastoral campsites in Cholistan were qualitatively different from those in Baluchistan during the same time period. Here, the camps are more or less permanent or semi-permanent to which the pastoral nomads returned season after seasons and probably inhabited them more than not. It is significant that of the total number of sites, 52 percent represent campsites. Mughal suggests that most of the population lived nomadic or seminomadic life during the fourth millennium BC in Cholistan.

This would suggest the existence of a desert environment with plentiful vegetation and moisture for its effective utilization for raising cattle, goats and sheep alongside the fertile flood plain for permanent human settlements.

Permanent Villages: The sites are generally located on or close to the former flood plain of the Hakra River all along its 300 miles long course in Bhawalpur region. The highest concentration is noticeable around Derawar, where the Hakra formed a playa like that of the Helmand River in Siestan. The Derawar area, having been fed by a channel from the Sutlej remained habitable for a very long time from at least the fourth to the second millennia BC as archaeological evidence demonstrates. Near the flood plain of the river, certain sites stand to the maximum height of 53 feet today in spite of their deflation caused by erosive windstorms over the centuries. Such sites represent prolonged occupation, often representing more than one cultural horizons. Ancient sites in Cholistan cannot be missed even if half buried in the sand because of their deep reddish brown color as a result of millions of potsherds lying exposed on their surfaces.

A large number of permanent village sites, with a buildup of stratigraphy and the formation of archaeological mounds are present in Cholistan during Hakra Ware times. The existence of mounds indicate the probable presence of mud and mud brick buildings and a degree of sedentism that was not apparent at the camp sites. The full stability of these kinds of villages is not known but one should assume that everyone who lived there, lived permanently year round. The other category of Hakra Ware sites are settlements representing mounds of varying size and heights and which are located in the alluvial flats or on the edge of low sand deposits. Such sites show prolonged occupation with a variety of cultural materials in addition to the diagnostic Hakra Ware and microlith. It is on these sites that evidence of possible links with the succeeding Early Harappan Kot Dijian (see next three chapters) culture is found. Since Kot Dijian assemblages are now dated to the last quarter of the fourth millennium BC, with which the Hakra Ware overlap at Jalilpur, it is very likely that the Hakra Wares appeared in Cholistan around the beginning of the fourth millennium BC, although a conservative date of the mid-fourth millennium has been suggested by Mughal.

It appears that some of the permanently established settlements were of substantial size, although their actual number is far less than those of small settlements. These are obviously the first settlements so far known in Pakistan utilizing both the desert and riverine environments, using wheel- made and handmade pottery, and a variety of stone tools. Mughal has made another interesting observation: along with locally made ceramics are found a few pieces of buff wares with black painting which are reminiscent of the fourth millennium BC pottery tradition of the Indo-Iranian borderland, possibly an offshoot of Togau style. Another observation is that few pottery forms and their surface treatments which can be compared with those of the succeeding Early Harappan period, occur only in permanent settlements.

Hakra Ware Pottery: Mughal h a s d i scussed the pottery of the Hakra phase in details in his *Ancient Cholistan;* a brief sumary follows. Hakra incised pottery is characterized by thick and thin, large and small bodied vessels decorated on the external surface with groups of multiple incised lines drawn horizontally, diagonally and in a wavy manner. It is extremely well fired and thick. The large and heavy vessels appear to be wheel-thrown. No other form of surface decoration occurs. In combining horizontal and wavy groups of parallel lines, the Hakra incised resembles the ‘comb incised’ pottery found in a variety of contexts in the Indus plain, Baluchistan and Iran. The Baluchistan-Iran influence is quite vivid. Another type of decoration and the most distinctive feature of the Hakra Wares is a

thick coating of mud mixed with small pieces of pottery and applied to the external surface of vessels of many shapes and body thickness. The vessel shape of the Hakra appliqué generally includes large storage jars with pronounced rim which is curved outside or a vertically straight rim which is generally plain. The body is thick, unevenly fired and shows various shades of red and even light gray color. The Hakra appliqué pottery was first noticed at Jalilpur near Multan in the earliest levels of Period I but the Hakra incised was not present at Jalilpur. A third type is the Hakra black burnished pottery. It consists of wheel-made carinated vases of thin fabric, red body and painted with a glossy black slip on the exterior. Rims of such vases are sharp and a carination above the base is very distinctive. Large vessels with high necks in this category are painted with non-glossy black color all over the external surface recalling similar shapes and surface treatment from a site located in India close to Pakistan's border on the Ghaggar. A fourth group, although a minor one, is the painted buff pottery with black painting on it. This type of pottery is not at home in the Indus valley proper, or even Baluchistan contemporaneously or in the prior times. It has all the appearances of an imported style. Finally, there is the painted pottery, the painted designs of which consists mostly of horizontal wavy and triangular motifs in black color on a red or cream slip.

Tools: The most striking feature of the materials associated with the Hakra Ware is an abundance of microliths, consisting of tiny parallel-sided blades, long blades with retouched edges, scrapers, cores and a variety of tools made of flakes. The lithics show a great variety of stone colors, including agates,suggesting different sources where the raw material or the finished tools were obtained.

Other Artifacts: Numerous pieces of grinding stones, balls and pieces of gypsum also occur. Terracotta balls, conical and cylindrical beads of red and grey colors, humped animal figurines with short legs, bangles with circular, triangular section also occur. Long cylindrical pestle of terracotta with rubbed sides occur with Hakra Ware.

Question of Continuity and Discontinuity: Continuity in culture, architect, technology, burial practices, and subsistence from the peoples of the Early Settlements (e.g., Mehrgarh I and II) has been stressed throughout the discussion in this chapter.There are, however, some discontinuities also. For example, absence of red ochre and animal offerings in the graves, and vanishing of side-wall graves. Other signs of discontinuity are mass production of pottery with more or less standardized shapes, a shift in the chipped stone tool industry away from true microliths to larger, bulkier types based on different technological principles and rather massive signs of craft production. The lapidary art was already known and practiced even by the Early settlers, but in Togau phase it reach an extraordinary height. These observations would tend to support the hypothesis that new ideas may have come to the site along with new people or a diffusion of ideas must have occurred with particular vigor. The precise mechanisms for these changes are not understood, but the roamings of pastoral nomads, the travel of traders and craftsmen as well as the adventurists have been historical constants in this region and they would have linked the inhabitants of Mehrgarh to adjacent areas on all sides during the entire period that this settlement was inhabited.

The role of north-east Iran is often sited as the sources of new ideas for the the people of Togau Phase but seems to be quite illogical: there is no evidence that the north-eastern Iranian sites, such as Chashma Ali, were technologically as developed as Mehrgarh. The time period under consideration at Chashma Ali is much shorter than that covered by Togau phase at Mehrgarh. In all probability, the sudden spurt of technological activity was of local pr regional origins rather than an outside influence. History is full of this type of such upsurges in technological and cultural activities, the

reasons of which still remain allusive. Other examples in Baluchistan's past have shown that a change in burial rites does not necessarily mean new peoples.

Conclusion: In this chapter we outlined the evidence for the development of village farming communities throughout the greater Indus valley, but more particularly in Baluchistan and the Harka flood plain in the Punjab. These communities apparently arose on the foundation of the early settlements in parts of Baluchistan and most likely at frequently used pastoral camps in Bhawalpur region. During this period people lived in well-established but scattered villages and pastoral camps, with an economy that was based largely on food production rather than on food gathering. An elaborate ceramic technology had already developed and numerous other crafts came into being, including lapidary arts and probably the working of copper. Distinct artifact styles evolved in specific regions, and these regions were connected through some sort of exchange or trade. This was not as much an era of innovation, change, and technological development as it was a time of geographic expansion, and improvements in existing technological base.

The advent of primary agriculture-based villages in the northern and central regions of Baluchistan led to the spread of population to other parts of Pakistan; to the Bannu basin on one hand and to the arid region of Cholistan on the other. This was, therefore, a period of growth in population, consolidation of agriculture and pastoral economy, and the growth of well-heeled regional cultures. Mature village farming communities of as many as 250 to 500 or more individuals were common enough, and with less dependence upon hunting and gathering as a secondary economic resource than was the case in primary settlements phase. We can recognize, therefore, the growth of a full-fledged sedentary society less self-contained than the earlier primary villages. This means, simply, that an increasing number of specialists became necessary to handle effectively the administration of a society whose families lived together the year round and whose collective effort in the cultivation of crops and herding of animals provided a total production which exceeded the individual subsistence requirement for that year - in other words, a society with a surplus which could be used for the acquisition of things not found locally. This surplus was, however, not enough as to be used in building collective structures, such as defensive walls.We note in this period the manufacture of fine pottery, beautifully painted with motifs in geometric or naturalistic styles in both black and red. This is the production of professional potters. It is symptomatic of the use of surplus foodstuff to pay for the services of a professional. How much this applied to weaving, stonecutting, wood carving, shell working, brick making - which crafts were common enough at the time - we are uncertain, but we can be reasonably secure in feeling that the appearance of these crafts in full array is a measure of the consequent success of agriculture and animal domestication.

A long period of almost one thousand years, covered in this chapter, seems to be rather uneventful, which in effect it has been. This period is, however, important in the prehistory of Pakistan in so many different ways. First, it represents the consolidation of agricultural and pastoral practices initiated by the early settlers in Baluchistan. More and more people started to engage themselves in this type of subsistence, the average size of settlements grew and these became established villages in every sense of the word. The number of settlements also grew. Second, it was a time period when the population seemed to grow quite rapidly. This growth in population compelled the Indus man to colonize habitable areas outside his traditional 'Neolithic' homeland, that is Baluchistan. As stated above, this geographical expansion reached all the way to the north, of which Bannu basin seemed to be a center, and to the east up to the arid land of Cholistan. Third, several individual and wellrecognized painting styles emerged throughout the inhabited area. This rationalization of pottery

style and the paintings on it is a strong indicative of a generalized regionalization of cultures, which characterizes this phase of almost one thousand years. Nevertheless, a strong tradition of inter-regional exchange and trade, initiated in the previous stage of the Early Settlements, continued unabated.

Archaeological evidence for the geographical expansion is everywhere in these regions but the intervening plains of the Indus are empty. There could be two alternative reasons for this anomaly. In the first instance, the river plains could not be inhabitable for want of appropriate technology of cutting trees that grew in abundance in the flood plains, and for the frequent inundations which the Indus wrought to the area. There is another aspect of this anomaly; if there were indeed human settlements in the Indus plains, their remains could have been buried under the accumulating alluvium or they must have long time ago destroyed by economic development in the area.

One detects a strong Iranian influence in the pottery of the time, even as far as Cholistan, but the direction and means of diffusion is not known. It could be through the actual migration of people from northern Iran to Baluchistan and the Indus valley, or it could be a result of the 'diffusion' of ideas. By the same token, it is not known if such a movement of people or ideas was indeed from west to east, that is from Baluchistan to Iran rather than from Iran to Baluchistan, as is generally believed.

Three distinctive 'cultures' represent this time period: (a) Togau, (2) Kechi Beg, and (3) Hakra Wares. The Kechi Beg and the Hakra Ware phases are approximately contemporary, the Togau phase is earlier than the latter. Furthermore, Togau and Kechi Beg undoubtedly represent the continuation of the Baluchi cultures while the Hakra Wares represent the first Indus culture when man lived in an arid land but away from hills and valleys of the mountains. The overt Iranian influence on the Hakra ware, however, indicates that the Hakra phase is too a regional offshoot of the Baluch cultural stem. The *how* and *when* of this process has not yet been determined.

As far as subsistence is concerned, the Indus man continued to sustain itself on barley and wheat as well as on goats, sheep, and cattle. Goats and sheep were probably more in abundance in the mountains of Baluchistan, and cattle more popular in the plains of Punjab. The arts and crafts kept their earlier base but tremendously increased in its capacity during this period of time. Technology remained practically the same, people still using the microliths and composite tools. The use of copper is in evidence at Mehrgarh but nowhere else. At Mehrgarh, there is strong indication of melting and possibly smelting of copper. We do not know anything about the social organization of these wellheeled pastoral societies and mature village farming communities but it is reasonable to assume that a complex social structure must have started to develop, given the tremendous increase in crafts and average settlement size. The burial practices changed and they were extensive, as indicated at Mehrgarh of the time. This time period of mature village farming communities and pastoral societies propelled the Indus man to the next level of cultural and technological development which prepared him for urbanization. The next three chapters deal with this part.

VI.4. Early Harappan Cultures



The preceding chapter described in some detail Th.e transformation of early Neolithic settlements of Baluchistan into mature village farming communities and well-heeled pastoral groups. This process

of cultural and technological transformation put the Indus man on a developmental trajectory, which would eventually lead him to the doorstep of urban civilization, a civilization that came to be known as the Indus or the Harappan Civilization. But before it happened, an important prelude was necessary. Some of the villages must become large enough as to pass as incipient towns; a large number of villages must integrate into mutually interdependent economic regions; agricultural efficiency must increase to the extent that some ‘surplus’ becomes available to be used for the common good; labor specialization must evolve for manufacturing luxury goods for the elite, the availability of utilitarian articles must become possible for the masses, an elite group must evolve who would control and direct the economic and cultural activities of the masses, etc. This transition stage, a period interposed between a strictly ‘rural’ economy and a full-fledged ‘city’ life can be considered as a formative stage, which effectively preluded the urban civilization that was to come. Chronologically, this time period roughly spanned from 3200 BC to 2600 BC and it constituted a determining factor for the rise of Harappan Civilization. What follows in the next chapters is an account of what this evidence is and how it might be interpreted within the context of the development of the city life to which all this momentum seems to be pushing forward.

Early Harappan or Pre-Harappan? Since this stage of economic and social development led to Indus or Harappan Civilization, some archaeologists and prehistorians have identified this time period as the pre-Harappan (or pre-Indus) stage: others prefer to call it the Early Harappan (or Early Indus). Both of these sets of terms are somewhat controversial. The former implies a break between this formative stage and the Mature Harappan Civilization while the latter suggests a historic continuity. Most of the international scholars, including Pakistan’s M.R.Mughal, argue for the latter appellation. Most of the Indian scholars, barring a few, however, prefer to call it pre-Harappan. Some others do not even care whether it is pre- or early. In this chapter and the next, we would use both of these terms as equivalent, designating it as a prelude to the urbanization of the Greater Indus Valley. This formative period encompasses several regional cultures which are known by such exotic names as Quetta Valley or Damb Sadaat culture, Amri-Nal culture, Kot Diji culture, Kulli culture, Dasht culture, and the like. These ‘cultures‘ are in fact archeological constructs that at best represent different phases of this pre-urban stage. They are also, to a large extent, geographical-specific.

In 1970, M.Rafique Mughal completed a Ph.D. Dissertation at the University of Pennsylvania, studying the stratigraphic precursors of the Harappan Civilization (23). There he put forth his concept for an Early Harappan stage of cultural development in what he termed “the Greater Indus Valley and northern Baluchistan”. Mughal’s efforts were directed to the organization of a large body of data from the Quetta Valley and on to the plains of the Indus Valley, which would provide insight into the

development of urbanization there in the second half of the third millennium BC. He consciously selected the term "Early Harappan" for this stage of cultural development:

"In my opinion the term 'pre-Harappan' is misleading because it creates the impression that a chronological gap exists between the 'preHarappan' period of the first half of the third millennium BC and the 'mature' period of the Harappan culture belonging to the later half of the third millennium. The other terms, 'antecedent' and 'protoHarappan' sometimes used in the archaeological literature are vague, remain unidentified and beg questions . . . I feel that all of the material found stratified below the 'mature' Harappan at Kot Diji, Amri, Kalibangan and the pre-defense levels of Harappa and related material discovered at other sites belongs to an Early Harappan Period assignable to the first half of the third millennium BC. Among these separately-treated sites, having regional differences in ceramics, there are many common traits present in ceramics, stone tools, and technology, terra-cotta objects and architecture which also occur in the 'mature' Harappan period. The radiocarbon dates also tend to strengthen the chronological priority of Kot Diji and related material over that of the 'mature' Harappan culture. It is therefore quite justified to call this material Early Harappan" (23)

Walter A. Fairservis independently defined the Early Harappan in his writings on the origins of the ancient cities of the Indus (24). He proposed that the regional mosaic formed by assemblages from sites such as Amri, Kot Diji, Nal and Kalibangan should be considered the "Early Harappan". "By this we mean the Harappan artifact form and decoration, not the civilization' (24). It was, however, Mughal who first develop the idea and he is the one who has been questioned most intensely about the appropriateness of the concept. In recent years Gregory Possehl has been one of its most important advocates (25). Mughal's terminology has not been accepted universally. It is used here because it highlights the lines of continuity that Fairservis, Mughal, Possehl, and some others see in the archaeology of the region.

Many other scholars, especially in India, have been reluctant, or even outright hostile, to acknowledge the usefulness of Mughal's views. The basis for this debate has a lot to do with the culture historical models that are used to grapple with the transition to urbanization. The Mughal position is anthropological and stresses continuity and internal processes of cultural change. The opposing model, or models, are more historical in nature and rely on external factors of change and a sense of discontinuity in the process of change, with new peoples coming into the region, interacting with the 'native' population to produce a synthesis that led to urbanization. Diffusion, migrations, and invasions can be potent historical forces for change and Pakistan was never a cultural vacuum during the Indus Age (25). This paradigm can, therefore, be as valid in principle as that of Mughal and this could be a bonafide basis for disagreement. The position of some Indian scholars, such as Chakrabarti, is however illogical, to say the least. On one hand they go a great distance to prove that the Indus Civilization was an authochnous phenomenon but on the other hand they deny to it its cultural base within the Indus Valley. This is, obviously, a result of their 'nationalistic' impulses that demand of them to 'own' the Harappan Civilization by robbing it of its Indus' heritage, even its name.

As Possehl has described (25), some of the criticism directed toward Mughal's position involved archaeological sites that had not been excavated when he wrote his dissertation, principally the settlements in the Gomal Valley excavated by Dani and his students from Peshawar University and Kalibangan which lead to his most important response to his critics in a far reaching paper (26). Mughal sticks to his position and makes a number of interesting points. First, he observes that

everyone agrees that the archaeological assemblages under discussion precede the mature Harappan. Mughal then asks a rhetorical question:" Does this imply "chronological priority, but not cultural? If so, some of us are perhaps expecting to find *the* site, such as Mohenjo-daro, which would give us an evolutionary sequence on unilinear scale from the early to the mature and late Harappan cultural phases. This brings up the vital and fundamental question of civilizational processes operating in the Indus Valley which led to urbanization gradually" (cited by Possehl in 25). For those who oppose migration into the region he asks: "Do we have any evidence of the Kot Diji related or Mature Harappan cultural stages outside the Indus Valley?" He then outlines the signs of continuity in the archaeological record and concludes that the best model to use in understanding the rise of civilization in Pakistan is one which sees the Kot Diji Phase and the related cultural assemblages as the linear precursors to the Mature Harappan.

The opposition to Mughal's position, however, continues. It has been said that the term "Early' is misleading in that it unquestionably implies a direct relationship between the proposed Early Harappan Phase and the Mature Harappan, i.e. the urban phase of the Indus Civilization. Because some believe that this cannot be proved, the use of the term is premature, and might be even incorrect. This criticism has some validity as the Happen urban phase itself is often divided into three phases: the Early, the Mature, and the Late. This obviously creates confusion and reveals an undisciplined thinking.

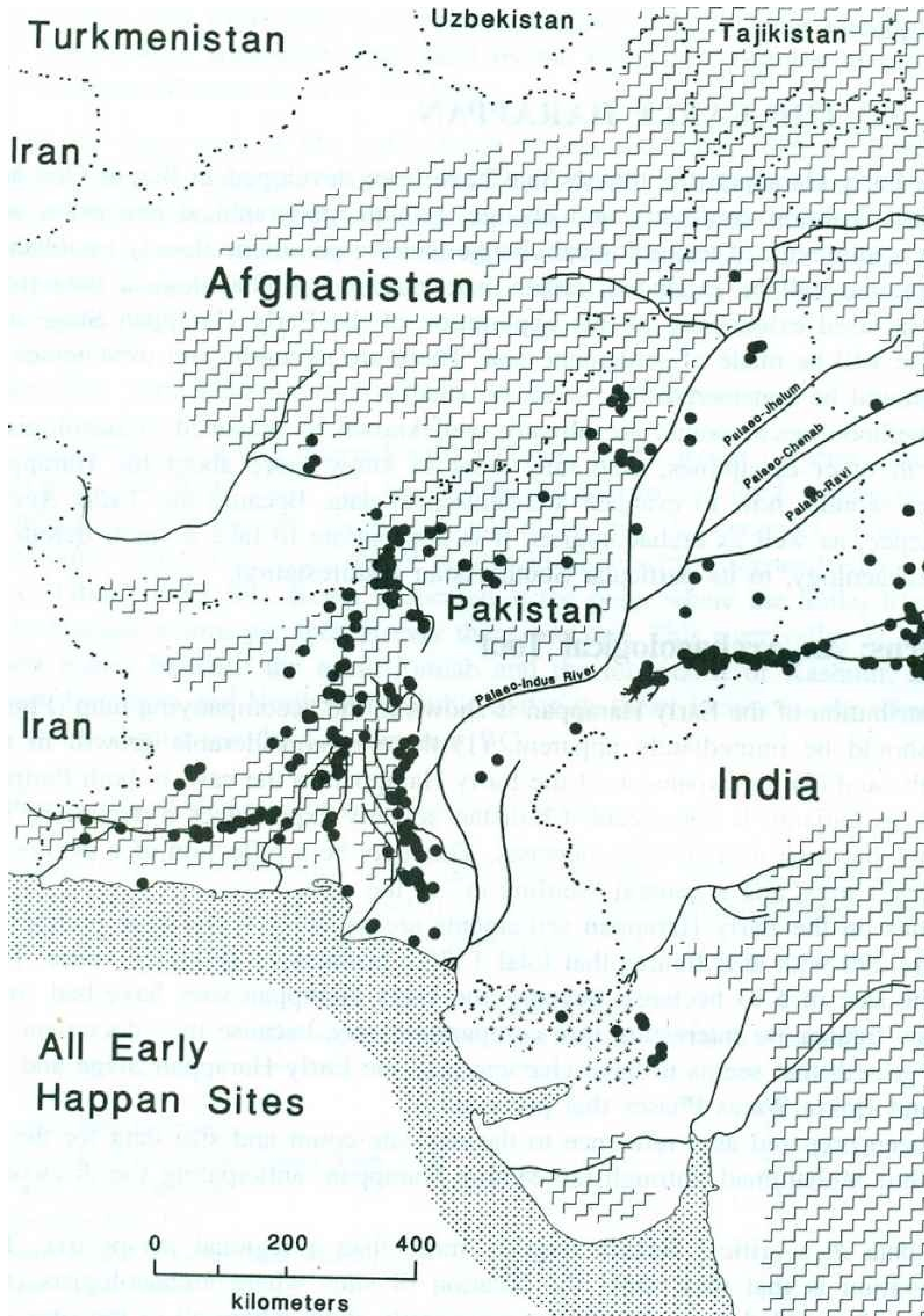
Xu Chaolong has published a substantial study of the Early Harappan which he defines as a body of material culture that precedes the Mature Harappan in time (32,33). Xu handles Early Harappan regionalism in a way different from that used here, preferring to emphasize the unity of Kot Diji Phase archaeological assemblage. This view has some merit and should not be slighted (25). The Early Harappan Stage has a kind of internal coherence, because of a number of shared features, including a common set of subsistence practices, some architecture, figurines and, most voluminously, pottery. Xu presents two interesting illustrations, showing the shared vessel forms between the cultures of the Early Harappan and the Mature Harappan. The principal weakness of Xu's scheme is its emphasis on Kot Diji ceramics and a lack of appreciation for the diversity of archaeological assemblages that precede the Mature Harappen (25) .

B.K.Thap[err joined the discussion with the following points (29): "Apart from the question of interpretation there are two other factors which are relevant to the issue: 1) the occupation of the Indus Civilization at each of the above sites seems to have started quite suddenly; and 2) the ceramic industries of the preceding deposit at these sites are not homogenous, but show instead regionalization, the use of any of the three terms portoHarappan, Early Harappan, or pre-Harappan, as a blanket term for a deposit immediately preceding that of the Harappan is obviously unsatisfactory". D.P.Agrawal took part in the debate with the following: " The Harappan culture, though essentially derived from the pre-Harappan cultures, continued to be coeval with the latter" (30).

The historical position generally proposes that there was a discontinuity between the Early and the Mature Harappan: that there was at best a kind of collateral relationship between the two. If the relationship is analogogous to a 'mother' and a "child', then what wre the archaeological siters or assemblages that might be used to define the "mother" and the "child" (25)?

What emerges from this criticism is that the term selected as an alternative to "Early" is "Pre" as in

“Pre-Harappan”. The problem with this term is that parallel critical comments leveled against “Early” can be equally directed toward “Pre” (25). “Pre” implies a lack of continuity between the PreHarappan and the Mature Harappan (the urban phase of the Indus Civilization). Since this has not yet been proved, it too might also be seen as “premature” if not entirely “incorrect”.



Turkmenistan
Uzbekistan
Tajikistan
Iran
Afghanistan
Palaeo-Jhelum
Palaeo-Chenab
Palaeo-Ravi
Pakistan
Palaeo-Indus River
Iran
India
All Early
Happan Sites
0
200
400
kilometers

It is widely recognized that the archaeollogical assemblages of the Early or Pre-Harappan are immensely different from those that characterize the Mature Harappan. But, when examined in detail there are also signs of continuity, and a transitional period linking the purely village farming economy, described in the last chapter, to the largely urban economy has been defined at Amri and Kot Diji. This phase is known from Harappa, Ghazi Shah and Nausharo (25). As exploration in Pakistan proceeds it is becoming increasingly clear that major surprises in terms of entirely new archaeological assemblages are less and less likely to appear. The players in this game of urban origins are all known, imperfectly to be sure, but still discerned and, as Possehl rhetorically asks (25): if the genesis of urbanization is not a product of the Amir-Nal, Kot Diji, Damb Saadat and Kulli phases, then where is it?

Some of the Indian archaeologists, such as Chakrabarti, look at the ‘Harappan” (mostly Late Harappan) sites in isolation, giving the impression as though the Harappan Civilization arose in that part of the sub-continent and later spilled over from there into the Indus Valley. They then look at the few pre-Indus sites around these Harappan site and find practically no relation of the pre-Indus assemblages to those typical of the Harappan. This is not surprising as the Indus culture in that part of the region was ‘imported’ and is, therefore, not supposed to have any relationship with any pre-Indus cultures that might have been present in the area. Thus, within the confinement of the Divide and Kutch/Gujarat, the use of the term ‘pre-Harappan” is very well justified but it would be a mistake, even a travesty of archaeological analysis, to apply this term or any such conclusion to the core region.

In view of some recent discoveries and considered analysis of Mughal, Possehl, Fairservis, Ratnagar, the Allchins, and others, we would here use the term Early Harappan or Early-Indus to identify and describe this interesting time in the life of the Indus people. Additionally we may use a less controversial construct, ‘a prelude to urbanization’ to describe this Stage of the prehistory of the Greater Indus Region. Although all of these terms mean the same, the ‘prelude’ is more descriptive and universal than the other two. Therefore, when confronted by the choice between the pre- or the early Harappan, we have chosen the latter, otherwise we stick to the ‘prelude to urbanization’.

Whatever its name, this formative stage involved the spread of settled life into southern Baluchistan and, at the same time, its diffusion into the Indus plains, while strengthening and developing several regional cultures in northern, central, and western Baluchistan. It also involved the spread of Indus cultures into the adjoining area of Gujarat and to some extent into the Indian Punjab and Haryana, an area that separates the Indus plains from the Ganges plains. In this aspect, this Stage of cultural development is not only a period of cultural and technological consolidation but also a period of unprecedented expansion, and the development of several complex regional cultures throughout Baluchistan and Sind as well as in some selected areas of the Punjab and the the area to its west. Of course, the long-standing connections with Central Asia and to some extent with Iran were maintained, in some instances even strengthened.

Regionalism During the Early Indus: Cultural diversity is one of the principal, perhaps predominant, themes in the Early Harappan Stage. There is also continued ontological growth and an increase in the apparent size of the population in the Greater Indus Valley during this time. The farmers and pastoralists of this period settled in all of the regions later occupied during the Mature Harappan, including parts of the Divide and Punjab in the northwest and parts of Gujarat in southwest

India. Some of this expansion in Gujarat and the Divide is still poorly known and perhaps mostly blown out of proportions. Different environments required different modes of adaptation in different parts of the land and since these adaptations could not have happened uniformly or along the same lines, the evolved cultural traits were still largely regional. This is the most parsimonious reasons for the observed diversity of cultures in different regions of the Greater Indus Valley during this Stage of cultural change. Another basis of this diversity stems, of course, from the earlier developments discussed in the last chapter.

Despite and despite the overwhelming influence of land and environment in different parts of the country, one begins to observe a common thread that seems to be running through these regions and their respective cultural variations. The pre-existent regionalism, discussed in the previous chapter, continued to manifest itself but different regional cultures started to merge into each other. As a result, the number of regional cultures drastically decreased, the respective areas of the newly evolving cultural regions became large, and the boundaries between these cultural units became rather fuzzy. The process of regional integration has indeed begun although one cannot discern it beyond the observation of a common ethos, a common Indus spirit, and a few common artifacts. This process would intensify in time until all the regional cultures or "cultural phases" converge into a common Indus Civilization.

As Irfan Habib notes (31), despite the different pottery traditions and other cultural traits, the Early Indus cultures had many features in common and despite the absence of 'revolutionary' developments in technology, some truly efficient modes of production and transportation made their appearance. First, there was a notable advance in agriculture, with the conversion of the ox into a draught animal. The discovery of cart-ruts in the Early Harappan levels at Harappa is to be placed alongside that of cart-wheels, cart-frames and bulls in terracotta models at Jalilpur in Punjab during this period. The use of the two-wheel ox-cart in the Indus basin is therefore probably not much later than the wheeled wagon (four-wheel cart) attested in pictographs at Uruk in Iraq just before 3000 BC.

What were the stimuli that helped to decrease the number of regional 'cultures' into three or four groups at the maximum, what made their boundaries rather fuzzy, and what assisted the spread of technology from one region to another or within one defined geographic region? In short, what were the forces that impelled the Indus man to a unified urban society? The answer lies in the examination and analysis of the Early Indus phase of Pakistan's prehistory.
the cumulative cultural diversity

Several factors could have contributed to this transformation. Undoubtedly one important element must be the relation established between the upland valleys and the flood plains. Another must have been the arteries through which long- distance trade flowed, particularly those originating in the main centers of wealth wherever they may have been. It is probably this trade, coupled with highly developed pastoralism, which provided stimuli for the development of an incipient urbanization in one part of the region, the Greater Indus Valley, and spreading it into neighboring interaction zones, such as southern Afghanistan and Siestan, even as far as Turkmenistan, leading to the growth of sites such as Shar-i-Sokhta, Mundigak, and Namazga into towns or even "caravan cities". A similar expansion occurred towards east, especially into Gujarat and to some extent into the east Punjab along the borders of the modern-day India and Pakistan. In this chapter and the next, we shall confine ourselves to the developments within ancient Pakistan, deferring the treatment of the borderlands to a separate chapter.

An Overview of Early Harappan Cultures: The Early Harappan Stage has been analyzed here as a collection of mature agricultural communities which are regionally varied in their 'culture' but which are nevertheless related to each other by a common thread running through them. Possehl has tried to treat this Stage in terms of three regional Phases that are thought to be generally contemporary with one another: the Amri-Nal Phase of southern Baluchistan and southern Sindh; the Kot Diji Phase of upper Sind, Punjab and the Pashtun country; and the Damb Sadaat or Quetta Ware Phase of central Baluchistan. Kenoyer et al have recently added a new phase, the Ravi Phase of Harappa, to this list. To these we would add the Kulli Phase that prevailed in the south of Baluchistan. Its position is debatable: some would like it to be treated as an offshoot of the Mature Indus Civilization while others would allow it to be considered as Early Harappan. We shall follow the later optionas considerable portion of this cultural phase indeed precedes the Mature Harappan Civilization. Possehl also includes in these regional cultures the so-called Sothi-Siswal Phase, some evidence of which we find in the Indian Punjab, norther Rajisthan, and Haryana along the Pakistan-India borders. Ronald Besenval would like to include in this grouping the Dasht Culture on the western coast of Makran, near the borders with Iran, and it is a matter of opinion if one treats it as a separate phase of the Early Harappan developments or merely an offshoot of some other tradition. The Northern Neolithic that prevailed in Kashmir and northern parts of Pakistan falls within the same chronological horizon and it must be mentioned. It must be kept in mind, however, that the contemporaneity of the Northern Neolithic Culture with the Early Harappan dose not make it a component part of the prelude to the urbanization of the Indus Valley. It is a cultural and geographical anomaly rather than an integral part of a broader picture.

This scheme, although simple and orderly, presents its own problems. Archaeological evidence does not allow us to divide the Early Harappan Stage neatly into a few distinct and purely regional Phases. We are therefore constrained to treat the subject in an informal way. We shall concentrate here on the Amri-Nal, Dam Saadat, Kot Diji, Ravi, and Kulli phases. Northern Neolithic will be discussed in a separate chapter that is especially dedicated to the cultural developments in the contemporary borderlands. Sothi-Sisal will not be reviewed in any details because it is but a reflection of Kot Diji Phase rather than a self-standing cultural phase.

We are dealing here with a chronological time period of about 600 to 1000 years, approximately between 3500 BC to 2500 BC, more precisely between 3200 BC and 2600 BC. Looking at the Early Harappan time as a whole, one observes a pronounced geographical expansion of agricultural settlements into Sindh, the plains of Punjab, the Pothwar plateau and the Salt Range, the Derajaats and Bannu, the arid zone of Cholistan and into Indian Punjab and Gujrat. During this stage, well-developed agricultural economies also spread into northeastern Iran, southern Afghanistan, even as far as northern Afghanistan and Tukmenia. The themes of cultural continuity and change, growth, and geographical expansion, detected in the preceding phase of the development of mature agricultural villages and pastoral camps, persist, with a few hints of new technological innovations. Regionalism is present but at much reduced level and in a much reduced contrast. The growth is, therefore, for the most part, best seen as ontological, not evolutionary. This is not to say that developmental change is absent from this stage. It is there, but it is not the predominant process.

The physical expansion of cultural systems that were already in place in the previous phases seems to have been the predominant theme within the Greater Indus Region during this time. These themes would become clearer as we examine the individual phases and cultures, described in the following chapter.

Of the various Early Harappan cultures we are considering in the next chapter, only the Kot Diji culture survived the onset of the Harappan Civilization in a substantial area, covering much of the Pashtun country and northwestern Punjab. At sites such as Rehman Dheri, Gumla and Tarakai Qila in the KPK Province, and Sarai Khola in northern Punjab, we have remains of this phase, largely corresponding to the chronological period of the Harappan Civilization. While showing some influence of the Harappan urbanization, they do not have any of its characteristic features, viz. writing, baked bricks, distinctive pottery, etc. Similarly, a local culture named after the type-site Kulli had established itself in southern Baluchistan and remained alive on the periphery of the Indus Civilization for considerable time period. In general, however, all of the regional cultures converged and after imparting some of their respective traditions to the Indus Civilization, vanished for good.

Subsistence Economy and Material Culture: We may recall that barley had begun to be cultivated at Mehrgarh in the Kachi plains as far back as 8th millennium BC and wheat probably a millennium later. Both of these are 'rabi' or winter crops. It is very well possible, in fact probable, that *jawar* and *Bajra* was introduced for cultivation as a *kharif* or summer crop during the Early Harappan Phase. This addition to food supply probably made its way from Africa through the Iranian plateau, of which Baluchistan is a part. If it is true, then the



Although not proven, the draught animals and plough probably came in use in the "Early Harappan" Stage of cultural development in the Indus Valley, greatly increasing the efficacy of wheat and barley cultivation.

amount of cereal production must have increased quite substantially in this Phase and it must have provided the fodder for the cattle, which the Indus man seemed to have begun to use as draught animals. The spread of the use of the vertical wheel, and therefore of the cart, was truly a momentous event, for it made heavy transportation possible in the plains. One can presume that cotton, attested before 6000 BC at Mehrgarh, continued to be grown, though there is no direct evidence for it in the period under discussion.

Once the ox is used to pull a cart, it is almost certain that it was also being used to draw the plough. There has, indeed, been found at Kalibangan (northern Rajasthan) at the Indo-Pak borders, a field with straight furrows, parts of which lie below some Mature Indus debris, leading the excavators to assign it to the Early Harappan period. The new use of the ox was not seemingly adopted everywhere. At Balakot (south-eastern Baluchistan), in its Amri-Nal phase, the oxen were slaughtered early, so that they could not have worked as draught animals; at Jalilpur (central Punjab), in its Kot-Diji phase, on

the other hand, the oxen generally attained their full size before slaughter, and so must have been used for work. The plough greatly lessened the labor of peasants previously performing the same task manually with the hoe, and also enabled the same family to till a much larger area of land. Accordingly, it brought a substantial increase in yield per head of population. These developments created the favorable conditions wherein a surplus of food was possible to be accumulated and this in turn made it possible to create a large class of non-agrarian people. They were the artisans, the managerial or religious groups, and the traders who were an integral and necessary component of an urban or near-urban culture.

Pottery was the most visible craft product, and wheel-made pottery dominates in all of the Early Harappan cultures. The stone was the chief material for tools, chert flakes and blades comprising the bulk of the normal tool-kit, with some bone tools thrown in. However, the technology was now firmly Chalcolithic (that is, using both stone and copper), and the progress in copper-smelting is shown by the remains of a workshop at Nal (Baluchistan). There is also a strong evidence of smelting of lead in Baluchistan. The more precious metals were also worked to provide ornaments.

Pottery decorations and terracotta figurines might also tell us about the people’s belief. Parallel to the bull portrayed in the Damb Sadaat or Quetta Ware is the horned figure on a pot from Kot Diji. Some archaeologists have taken the former as an indication of bull worship and the latter as a sign of ‘horned deity’. Female figurines in clay found at Jalilpur, Gumla and Sarai Khola (Kot Diji sites) as well as in Quetta Valley, Zhob-Loralai (central Baluchistan) and at Mehrgarh (Kachi plains) have been interpreted as the worship of some form of Mother Goddess. These interpretations probably stem from a general tendency of western scholars to excessively romanticize the concept of gods and goddesses in foreign cultures. The insistence of some Indian scholars on the religious nature of such decorative depictions evidently stems from their reflexive desire to connect the later traits of Hinduism with the antiquity of the Indus Civilization. The fact is, however, that neither the funerary rituals of the Harappan Civilization nor most of its ‘deities’ can be traced to any of the Early Harappan cultures. The connection of the bull and horns painting or that of the female figurines with the Indus religion of the time is tenuous at best.

Funerary rites are an important aspect of religion. In the Amri-Nal culture area, at Nal and Damb Buthi in Baluchistan we find fractional burials, which show that the dead were left exposed, and later their bones were collected and buried along with pots. At the Kot Diji sites of Periano Ghundai and Mughal Ghundai (northern Baluchistan), on the other hand, the dead seem to have been cremated first and then their bones collected and put in pots to be buried. No straightforward extended burial is firmly attributed to the Early Harappan period although it is possible that the burial of flexed bodies, practiced at several sites in the preceding times, may have continued.

Unlike the funerary practices of Mesopotamia and Egypt, no Indus burials from this period revealed individuals interred with great wealth. Although Mehrgarh and Nal are the only sites where cemeteries from this period have been excavated, the burial show a smaller amount of wealth compared with the burials of the earlier Neolithic inhabitants of the sites. This dramatic change in burial customs is intriguing because it suggests that unlike other communities to the west, the people of Mehrgarh and Nal chose to keep their wealth in circulation rather than burying it with the dead. This distinctive burial pattern is also seen in the cemeteries of the later urban phase that have been excavated at Harappa, Mohenjodaro, and other sites.

Some scholars have argued that because of the absence of elite burials the society was not really divided into classes of elites and commoners, but many other categories of evidence do not support this argument. For example, many settlements became separated into two or more mounded areas, with one mound often being much higher than the others. The separation may represent the division of different communities into separate neighborhoods or the elevation of the elite to a high place overlooking the main settlement. This explanation assumes that the society was segregated into distinct living areas defined by ethnic affiliation, social status, profession, and the like.

Yet, the extent of social differentiation was rather limited. Seals, if they are seen as symbols of ownership claims, are rather rare, Th.ough some small terracotta seals from Quetta Valley, Mehrgarh and Nausharo (Kachi plains) have been reported. Anything that can be called a palace or monument building has not been identified. Defensive walls, which are most likely to have been the work of rulers, are found at Kot Diji, Kohtras Buthi (western Sind) and Rehman Dheri in Bannu District. But the impression one gets is of small principalities, rather than large powerful cities or states

There is no evidence of writing. Potter’s marks found in the Amri-Nal strata of Balakot and at the Kot Diji site of Rehman Dheri may signify either the individual artisans’ marks or ritualistic symbols. Significantly, the Balakot and Rehman Dheri marks do not match well, and the relationship of either to the Indus script is debatable.

Clay from the riverbanks was made into handsome vessels that were painted and fired in special kilns to produce red or gray ceramics. The high temperatures and special pigments allowed these early artisans to develop the first glazing technology using steatite to make white or bluegreen colored beads. Eventually powdered quartz was fired to create a new material known as faience, which could be coated with silica and copper minerals to produce a shiny turquoise glaze. Copper spears and ornamental pins reflect uses for metal, from weapons and tools to ornaments. The alloying of copper with tin or arsenic may have begun during this period: it was well established during the early urban phase. Alloys may have first been used to produce different color tones in metal, but metal smiths soon came to appreciate that alloys also increased the hardness and working life of a metal tool.

Along with these craft technologies was the beginning of abstract designs that may be the predecessors of writing. These marks, often referred to as potters’ marks, may have been necessary to distinguish pottery made by different individuals when they were all put together in a single kiln for firing. Other signs, called graffiti, were scratched onto pottery after it had been fired. These signs may have indicated the contents of a vessel, the owner of a vessel, or possibly magical symbols related to religious beliefs. Although some early potters’ marks and graffiti are identical to signs of the later Indus script, the invention of the Indus script probably did not evolve from potters’ marking their wares. It was probably invented by or for the people who controlled the cities and not the artisans who labored in the workshops. Such identification marks are found on pottery from all of the Early Indus cultures but no sign of writing seems to be emerging from the remains of this time.

With the invention of new techniques, creation of agricultural surplus, and production of specialized objects came the problem of protecting and controlling these valuable commodities. Compartmented buildings continued to be constructed that served for the storage of surplus grain. At some sites, houses were built around a central courtyard that provided an open space for working, but was private from the streets and lanes of the settlement. Some villages were surrounded by thick walls, made from sun-dried brick. These walls served as protection against raiding and intrusion of wild

animals, but they also defined a boundary around the village to which access could be controlled. By having walls and gateways, anyone carrying goods or commodities into or out of a settlement could be monitored. We do not know if taxation developed during this pre-urban period, but the basic structure of control had become well established before the appearance of the first cities.These walls also protected the villages from annual floods, and as the site grew, they had to be extended. Many surrounding walls level. This technology for raising and protecting a settlement against floods became essential for large cities that were located on important crossroads in the middle of the alluvial plains.

Irrigation technology, invented during this period, was practiced primarily along the piedmont zone and in areas where the tributaries of the larger rivers could be exploited. Out on the active flood plain there was no possibility of controlling the mighty rivers and, in fact, there was little need to do so. The annual flooding created ponds and oxbow lakes that served as reservoir for agriculture, for watering herds and for fishing.

Village Farming Communities**!**



The art of pottery making became became wide

was a hub during the specialized associated with the Togau phase at Mehrgarh, with six meters of deep, loosely broken kiln walls and wasters of over-fired pots. from the bottom to the top of this deposit homogeneous, it is also evident that this thick stratified trash accumulated in a rather short span of time during which potters worked intensively in this area. Growth is also seen in the improvement of other crafts and technology.

There is not much more copper in Mehrgarh Period III but now there is evidence for melting, refining and possibly smelting

copper. Testimony for this comes from a building of domestic type with three
spread by 4000 BC throughout the Greater Indus

Valley. walls which is open on the western side. The floor and walls were burnt, and the excavation team believes that it was used as a firing structure. This building contained one complete and thirteen broken crucibles with copper degs and

War was absent in this stage as it was during the previous times. Although some settlements
stains. An important product of this new craft is an early example of a pin with
did have walls around them for protection, we have
double spiral head. Three compartmented seals were found at Mehrgarh III along
not found evidence for massive destruction levels or
with unidentifiable fragments of the metal and one tubular gold bead is also
slaughtered inhabitants at any of the sites. Ash lay
ers at the site of Kot Diji may represent the intenassociated with this period. Overall, copper is rare in Togau phase and Mehrgarh
tional destruction of the site, but fire could just as
is the only site where direct evidence for smelting, refining or melting the metal
well have been accidental. The settlement was
has been found.soon rebuilt and strong continuities in ceramics and
other artifacts suggest that the inhabitants were not
A surface survey of the Mehrgarh III settlement area revealed considerable
replaced by a new culture. A similar pattern of burnevidence for craft activity involving the manipulation of lapis lazuli, carnelian,
ing and rebuilding has been documented at the site
of Naushahro, but here too there is no evidence for calcite, garnet, turquoise, shell and bitumen. Micro-drill in phtanite, several shell
killing or intentional destruction of the town. In con
pieces, some bone awls, grinding stones, pestles, and flint tools were recorded.

trast to these towns, at Harappa there is no evidence for discontinuity of occupation between the Early Indus and the Harappan phases, but over

several hundred years, artifact styles such as cecialization. The other process that leads to the de
Along with these craft technologies was the beginning of abstract designs thatvelopment of stratified social classes is agglomera
This diverse evidence points to the abantion, where individuals or entire communities ofmay be the predecessors of writing. These marks, often referred to as potters'
donment of well-established settlements but at the specialists become attached to a large community.
marks, may have been necessary to distinguish pottery made by differentWith the creation of distinct communities through
larly, there is evidence of widespread burning of fragmentation or agglomeration, new relationships individuals
when they were all put together in a single kiln for firing. Other
villages but there is an unmistaken hint for reoccuemerged, and social classes were ranked on the
signs, called graffiti, were scratched onto pottery after it had been fired. Thesebasis of complex

social, economic, political and re
cultural discontinuity, showing the movements of ligious factors.signs may have indicated the contents of a vessel, the owner of a vessel, or
new occupants, but there is more evidence for a Many occupational specialists at these possibly magical symbols related to religious beliefs. Although some early
general continuity in culture and technology. The towns may have evolved through the process of process of urbanization and cultural integration in social fragmentation as the need for pottery-making,potters' marks and graffiti are identical to signs of the later Indus script, the
the Indus Valley probably did result in battles over brick-making, woodworking, etc. made these crafts
invention of the Indus script probably did not evolve from potters' marking their
control of resources and the destruction of some a viable profession. Other communities of occupa
villages, but we have little archaeological evidence tional specialists may have agglomerated to thewares. It was probably invented by or for the people who controlled the cities
for this. What we do see are symbols of status and settlement from other regions: shell-workers from and not the artisans who labored in the workshops. Such identification marks are
power that indicate the presence of different classes the coast, metalworkers from the highland regions,
found on pottery from all of the Early Indus cultures but no sign of writing and bead-makers from the mining areas. The rela
ing a vital condition for the rise of cities and early tive ranking of these occupational and craft specialstates.seems to be emerging from the remains of this time.ists would have been closely tied to the importance With
of their products for reinforcing and maintaining so
the invention



Necklace made of black, unfired steatite and white, fired steatite disc beads, Naushahro I, c. 2800 BC (after Kenoyer)

of newcial status. Some scholars would like to connect this
techniques, creation of agriculturaltype of social order with the development of cast system that later on became an integral part of surplus, and production of
Brahmanical Hinduism.
specialized It is thought that ornaments made of precame the objects
cious stones, painted ceramics and and metal tools problem
of
protecting
found in the houses and working areas of sites such controlling these
as early Harappa, Mehrgarh, Nausharo, and other
valuable
such 'towns', reflect the presence of high-status These advances in economic activity help commodities.

Compartmented

individuals. Similar styles of ornaments made in to explain the much larger number of settlements, ofbuildings continued to be clay, undecorated pottery and stone tools may rep larger size and more permanent nature than thoseconstructed resent less important people. This pattern coincides

of the preceding ‘Neolithic’ cultures, discussed in that served for the with the presence of ‘granaries’ that have been ex storage of surplus grain. At some sites, houses were built around a central cavated at Mehrgarh, Nausharo, Harrapa and Mo
the preceding two chapters. Mud-bricks were uni henjodaro. Thus, it is very well possible that a socialcourtyard that provided an open space for working, but was private from the stratification had started to manifest itself in thesometimes used, whenever locally available, instreets and lanes of the settlement. Villages were surrounded by thick walls,Early Indus period of prehistory, at least at somefoundations and in lower levels of walls. However, places or in some regions.made from sun-dried brick. These walls served as protection against raiding and In every society, social status is defined by mated size of Harappa, in its Kot Diji levels, is 40
wild animals, but they also defined a boundary around the village to which material possessions and the power to act in certain
hectares, and a similar size has been claimed for ways. However, which objects are determined to access could be controlled.
By having walls and gateways, anyone carrying have high value differs in each region depending onPossehl estimates that based on the size of 291
goods or commodities into or out of a settlement could be monitored. We do notthe availability of materials as well as ritual beliefs. Early Indus sites, the average size was 4.5 hecFor example, lapis lazuli was an important symbolknow if taxation developed during this pre-urban period, but the basic structure
hectares in individual size. The Urban Revolution of wealth and power in Mesopotamia because it of control had become well established before the appearance of the first cities. was brought from the distant regions of Baluchistanhad not yet arrived, but some settlements were cerand Badakhshan in the north of Afghanistan, whiletainly getting close to being small townships.
These walls also protected the villages from annual floods, and as the site grew,in the Indus Valley this more easily available stone **The Emerging Specialization and Social** was relatively unimportant. In contrast, the Indus they had to be extended. Many surrounding walls level. This technology for
resulting in stratified classes and occupational speelites preferred objects made of materials that were raising and protecting a settlement against floods became essential for large transformed by complex technology, such as facialists set the foundation for later social organiza
cities that were located on important crossroads in the middle of the alluvial ience, stoneware and red carnelian. With the rise of

characterized by two different models of social
plains. fragmentation and agglomeration. As individual arti
sans or their families became more specialized in
one occupation, such as herding, fishing, shell
working or pottery making, they became socially Page 242
and economically separated from the rest of the
community which eventually led to the formation of
distinct social classes based on occupational spe
Indus cities, craft that produced these materials and elaborate objects became more important as a means for reinforcing and maintaining the social order. Consequently, the control of these crafts and their products would have been essential for maintaining political and economic power.

In some communities, the highest status is given to people who acquire goods that are then redistributed to everyone in the community. Usually, these goods consist of consumable items, such

as livestock or produce, but occasionally they include exotic ornaments or tools made from rare materials. In other societies status and power is represented by the accumulation of wealth and the display of valuable ornaments and clothing, and building monumental structures such as temples and tombs. Since no structures have so far been uncovered from the time period under discussion, it can be safely assumed that a higher status was dictated by the control and distribution of grain and probably other material.

The division of a town or city into two separate areas became a common feature of the Mature Harappan civilization. The beginning of this custom in the Early Indus times is unmistaken. The excavations at the sites of Amri and Kot Diji found two distinct habitation areas, one of which may have been surrounded by a massive wall. At Amri the wall was made of sun-dried brick, and at Kot Diji itwas built with stone. At both sites, the process of segregation was not abrupt but occurred over hundreds of years and many phases of rebuilding.

House size and complexity is another indicator of different classes or social stratification. At Mehrgarh and also at Nausharo, some six kilometers to the south of Mehrgarh, large houses with many rooms are distinct from smaller structures, indicating different classes of people and a hierarchical division of classes. The most convincing evidence for different classes of people and different ethnic groups is economic and technological specialization, combined with regional styles of artifacts such as pottery. Farmers were probably becoming distinct from fisherfolk and herders, and rural populations were becoming distinct from people living in large settlements. Each of the major crafts probably developed into specific ethnic or social classes. Even within these crafts there would have been a hierarchy of communities. Society was gradually divided into those who had access and control of crafts and the artisans who were producing various commodities.

The evidence for social and economical stratification of society at this early stage of development, as outlined above, is substantial. However, we do not see as clear and overwhelming evidence as it is available for Mesopotamia and Egypt. There are no palaces, there are no temples, and there are no lavish burials. It is the opinion of this author that the question of social stratification, important as it is in the development of an urban society, has been needlessly stressed. One can feel the impulse for seeing the cultural developments in the Indus Valley on the part of some scholars through the prism of Mesopotamia and Egypt with which they were more familiar. The modern archaeologists and prehistorians do not generally suffer from this ailment but they are somehow afflicted with the romantic notion of a ’living’ Indian civilization whose roots go back as far as the Early Indus period. These authors conveniently draw parallelism between the castridden society of present-day India and a likely social structure of the past, from which this structure presumably developed. Specialization in arts and crafts, the availability of agricultural surplus, the control and distribution of this surplus, and the natural highs and lows in the possession of wealth are the necessary conditions for urbanization, but to say that the whole society somehow became stratified into well-defined and segregated groups of people at this early age is rather far-fetched.

Archaeological evidence points to the fact that the artifacts were not always used at the location of their production. For example, by 4,800 BC, during Mehrgarh III, the site no longer consumed finished products made in that region, but rather it produced them. Copper, shell, agate, chert and minerals for pigments were obtained from distant sources and processed by highly skilled artisans at the site. Mehrgarh producers soon made superior painted pottery, glazed steatite and faience objects and traded to the outlying regions for more raw material or other articles of use.

Looking at the Early Harappan Stage from the Vintage Point of the Harappan Civilization: The Early Indus period, while viewed as a continuation of the development of agriculturebased cultures and the maturation of village farming communities, can also be studied as a harbinger of urbanization that was to come in the form of the Indus Civilization. In fact, both of these two trends are operative - expansion and maturation of agriculture on one hand and the formation of incipient town culture on the other.

Although no one believes in the linear progression of any of these regional cultures and their transformation into the Harappan tradition, there are more and more scholars who agree that somehow each of these cultures, especially the Kot Diji culture, contributed to the rise of Indus civilization. Evidence is slowly accumulating to show that a brief transition period intervened between the cultural diversity of the Early Harappan period and the fullblown urban civilization. Of course, some regional cultures adopted the new urban culture more readily than the others. Some areas were entirely submerged in the new, more advanced, civilization while some were only wetted partially. In short, all of these regional cultures seem to be the foundation of the urban civilization that was to come and that is the main rationale for calling this period the Early Indus or Early Harappan period. It should be obvious from the above that during this stage of cultural development, the preconditions for the development of cities and state-level societies were fulfilled in each of these cultures, although in slightly different ways and in different combinations.

New technologies that developed in conjunction with trade begin to fulfill another major precondition for the rise of urbanization, which is the presence of appropriate technologies to build and maintain a town or a city. Many basic technologies were developed during the initial phase of settling down, but towns and cities are different from villages, both in scale and complexity. More varieties of distinctive ornaments are required to differentiate the many different classes of people who live in cities. Specialized technologies were invented to create new materials just for the elite: high-fired ceramics, higher qualities of glazed steatite and faience, stoneware, decorated carnelian and bronze.

As settlements became larger during the last phase of the Early Indus stage, we see the first evidence for building latrines, drains, and washing areas. We have not yet identified wells from the early settlements, but this is possibly due to the fact that wells are usually maintained for hundreds of years and are often repaired by later inhabitants. Some of the wells in the later Indus cities may have been first constructed by the earlier villagers.

Beginning in the 7th millennium BC, as the first farmers settled down in the Early Settlements of Kili Gul Muhammad and Mehrgarh, and continuing through the development of village farming communities of Tagau, Kechi Beg, and Hakra, these networkks gradually enveloped the entire populated area that spread out across Baluchistan and the Indus plain. At the major crossroads of these trade routes, new villages sprang up, some of which eventually became the large towns and cities of the Indus Civilization. Harappa, Mohenjo-daro, Mehrgarh, Jalilpur, etc are the examples.


The oxen were most likely used to draw the plough in the Early Harappan phase

We usually distinguish towns from villages by their size: a town contains a much larger number of people than a village. We also make a distinction on the basis of the inhabitants' occupation: a village consists mainly of those who live by agriculture or cattle-rearing; a town, mainly of those who follow non-agricultural crafts, and provide labor and services to other townsmen. A moment's reflection will show that this necessarily follows from the town simply being larger than the village. If a village, containing people who live by agriculture, grows larger, many of its inhabitants will have to till fields or take cattle, goats and sheep to grazing grounds at very long distances from it, and the inconvenience will force them to move to a new village closer to their fields or pastures. A village that is based purely on agriculture or pastoral pursuits cannot, therefore, grow beyond a particular size. But for craftsmen, traders, and other service providers there would be no difficulty in living in large settlements, for they can still go on working in their homes. Indeed, the larger the settlement grows, the better it can supply them with customers and meet their needs from its markets and shops. The emergence of towns, which archaeologists initially recognize by the large area their remains cover, necessarily implies the presence of a considerable number of people who do not grow food for themselves, but work at crafts or perform services while subsisting on food produced mainly by villagers.

Such a situation could only be brought about when peasants grew more food than they needed for their own bare subsistence, or, in other words, produce a 'surplus'. Such ability did not immediately come about when agriculture first began to be practiced during the Neolithic times, covered in the preceding chapters of this book. A further set of developments was necessary to increase agricultural production, for example: addition to the inventory of crops cultivated, making it possible to obtain both food and 'industrial' crops, and the use of oxen and other beasts of burden to be yoked to the plough and to the cart, thereby helping to till a much larger area with the same amount of manual labor and to transport by cart the surplus grain to the towns. As indicated in the previous pages, both of these conditions were met in the Early Harappan cultures discussed here. First of all, the *rabi* crops

of barley and wheat were supplemented by the *kharif*' crops of *jwar* and *Bajra.* These food crops were further augmented by the probable cultivation of cotton, which supplied a vital raw material to the artisans engaged in spinning of thread and weaving of cloth. Second, the wheeled cart and plough came in use, and there is strong evidence for it.

On the other hand, the number of nonagricultural crafts and their practitioners multiplied because of a number of inventions: the spindle and the loom, the potter's wheel, the smelting of copper, the bow-drill, the cart wheel, and the ever increasing pottery forms. These inventions called for greater specialization of skills and so of a progressive division of labor in which one individual concentrated on a single craft. The craftsmen could obtain their means of subsistence by passing on their products by sale to their customers, many of whom lived in the towns or large villages. The artisans acquired their raw material locally as well as from long distances through third parties. This system of exchange gave birth to trade which is the backbone of an urban society and the evidence of which we encounter often as we study the remains of the Early Indus cultures.

It is therefore not surprising that through this 'surplus' created by the peasants, division of labor and specialization, technological inventions, and trade or exchange, some settlements of the time became much larger than the average agricultural village communities. In fact, as mentioned before, the site remains of some villages found from this era are extraordinary larger than the majority of them. These were most likely the 'towns' rather than the agricultural villages defined above. These 'towns' did not grow into 'cities' at par with the Indus civilization that was to come and they were by no means the urban centers that followed. Nevertheless, the seed of the Indus cities were sown and the raw material for the onset of an urban civilization was definitely at hand.

One of the precondition for the development of towns and cities or even providing a foundation for such a process is a diverse agricultural and pastoral subsistence base that can produce enough surplus to feed the population centers in a secure manner regardless of short-term problems such as drought, flood or war. This precondition was easily met in the Early Harappan stage due to the presence of a very extensive as well as expansive river system with rich agricultural land, abundant fishing resources in the rivers, lakes, and coastal zone, extensive and diverse grazing lands on the riverine and semi- arid plains and in the highlands. Because of the proximity of these different productive zones, failure in one area could always be supplanted by obtaining food from a different source. This is often done through social and economic contacts with other communities.

The classical 'trade' definitely played a pivotal role but more so was the system of 'exchange' that is not based on instant parity but on a generational time scale. Such an 'exchange' is common even to day in certain parts of Pakistan. For example, it is a common practice in the Thal desert that in times of drought, the inhabitants of the inflicted area move their animals, sometimes men, women and children as well, to the areas where water, food, and fodder is still available and then wait for the better times to come. The host communities do not get anything in return at the time but it is a favor granted to the distressed community in anticipation of the return of a similar favor whenever they themselves could be in such a need. The favor given in the present generation could very well be returned in the next or the next to the next generation. Thus a system of selfsustaining insurance is firmly in place. It could be easily visualized that such an insurance system or the self-understood arrangement of 'generational exchange' could have been practically a norm in the ancient times of the entire land.

For the development and maintenance of large population centers, it is also necessary to have diverse and abundant resources for building large settlements and supplying raw materials for making tools, ornaments and religious objects. During the Early Indus period, explorers from villages in different regions searched out the sources of precious materials such as lapis lazuli, carnelian, copper, seashells, and gold. The pastoralists, obviously, played an important role in such explorations. Boulders from mountain streams or chert nodules from the central Rohri hills were used for making tools and grinding stones. Many essential raw materials were available in different locations of the greater Indus Valley. This pattern of distribution may have played an important role in stimulating competition between different regions and the search for additional sources.


Pastoralism continued to be a dominant part of subsistence economy in the Early Harappan phase

Easy means of transportation played an important role in consolidating the cultural gains of the adjacent lands and spurred trade and exchange between distant regions. Two-wheel carts pulled by oxen were used for heavy transport across the plains while flat-bottomed boats and rafts were probably used on the rivers. Human porters or pack animals such as oxen, water buffalo, and half-ass could have moved goods back and forth from the highlands. The major new development at this time was the importing of raw materials from distant sources to workshops in the larger settlements. Whereas the initial processing of raw materials such as copper, stone and shell occurred at the source areas, final processing was done in workshops located at the settlements, where it was easier to control the style of objects being produced and was also economically more profitable.

Conclusion: I n this chapter we reviewed the formative stage of the Indus Civilization, and we identified this time as the Early Harappan period covering a time span between 3,200 BC and 2,600 BC. We divided this stage into several regional cultures or phases, which were more or less contemporary to each other. These different regional cultures will be discussed in details in the next two chapters. Briefly speaking, however, the Amri culture belonged to the western fringes of the Indus plains while the Nal culture has been strong in southern and central Baluchistan as well as up the hills to the area of Jhalawan in central Baluchistan. The Damb Sadaat is generally considered a culture of the hills and water-containing valleys: it thrived in the Helmand interaction zone, encompassing the Quetta Valley, southern Afghanistan, and northern Iran. Its influence extended as far

as Mehrgarh, just at the edge of the Indus plains. The Kot Diji is generally considered a riverine plains culture; the geographical area of its influence comprised of the upper Sind and Punjab. The Kulli culture is identified with southern Baluchistan but it had several features in common with the Mature Indus culture that was to arise in the greater Indus Valley.

With so many of the major sites still largely unpublished, with so many of the excavations themselves only partly published, with so many sites not excavated at all, and with so many claims for the discovery of the "Harappan" or "preHarappan" sites in the eastern borderlands, it is still impossible to make a judicial analysis, or fully comprehend the meaning of the Early Harappan period. We can, however, at least go some way in this direction and this is what has been attempted in this chapter. From all this evidence we conclude that, whatever the changes that occurred between the development of mature agricultural villages in Baluchistan and the Mature Indus Civilization, and however they are to be accounted for, the Early Indus stage must be seen as the formative period, the stage of consolidation, the stage of incipient urbanization, the stage of unprecedented expansion, in short a prelude to civilization. The examination of the archaeological record and the analysis of the material remains serve us only to understand the process through which this transition from basic agricultural village economy to a truly urban society took place. We now do have some answers to "how", "when", and "where" of this process but a lot more remains unanswered.

Agricultural settlements, based on wheat and barley, and domesticated cattle, sheep and goats, began to appear prior to this period in Baluchistan. As these settlements expanded into the Indus plains, they transformed into mature agricultural villages and towns. These settlements had regularly constructed houses, often with surviving traces of town walls, some of considerable size. While they still relied on stone for their tools and other implements, they also used copper, and probably bronze. Thus, in many areas the Early Indus settlements can be traced back to an earlier Neolithic stage, and in those crafts where local fashions had already appeared, such as pot making.

During this period, the regionalization of the previous phase continued but the differences between the various geographical and cultural areas were much less starker. The boundaries were rather fuzzy and sometimes it is difficult to assign certain artifacts to one cultural region or the other. All in all, multiple cultures were fusing into each other and a common ethos was evolving. Indeed, the pottery of the entire Indus system from the late fourth and early third millennium BC may be said to belong to a single craft province, originating in Baluchistan. This trend would continue to result in a common and all-encompassing culture, which we call the Indus Civilization.

Because the Early Indus period corresponds with the Early Dynastic period of Mesopotamia and the most affluent period of such Iranian sites as Shahr-i- Sokhta, we may expect, and indeed some evidence is forthcoming to confirm these expectations, that there would have been an unprecedented increase in trade with these regions. Still more immediate and far more significant contacts are in evidence between southern Baluchistan and Central Asia where cultural and technological developments paralleled with those of North-Central Baluchistan and the Kachi region at the edge of the Indus plains. Several sites in Turkmenistan, such as Namazga, and several in southern Afghanistan, such as Mundigak near Kandhar, are testimonial to their cultural affinities with those of the Indus system. Obviously, trade played a significant role but more so was it probably the result of human migration between these regions.

Until positive evidence is available to disprove it, we must assume that during all this time there was

no settled agricultural communities in the east beyond the current Indo-Pak borders. A few settlements that have been discovered along the border in the Indian Punjab, northern Rajistan, and Gujrat were the result of thegeographical expansion of the Early Indus culture into these borderline areas. This is in stark contrast with the developments in the western borderlands where they were quite in sink with those of Pakistan.

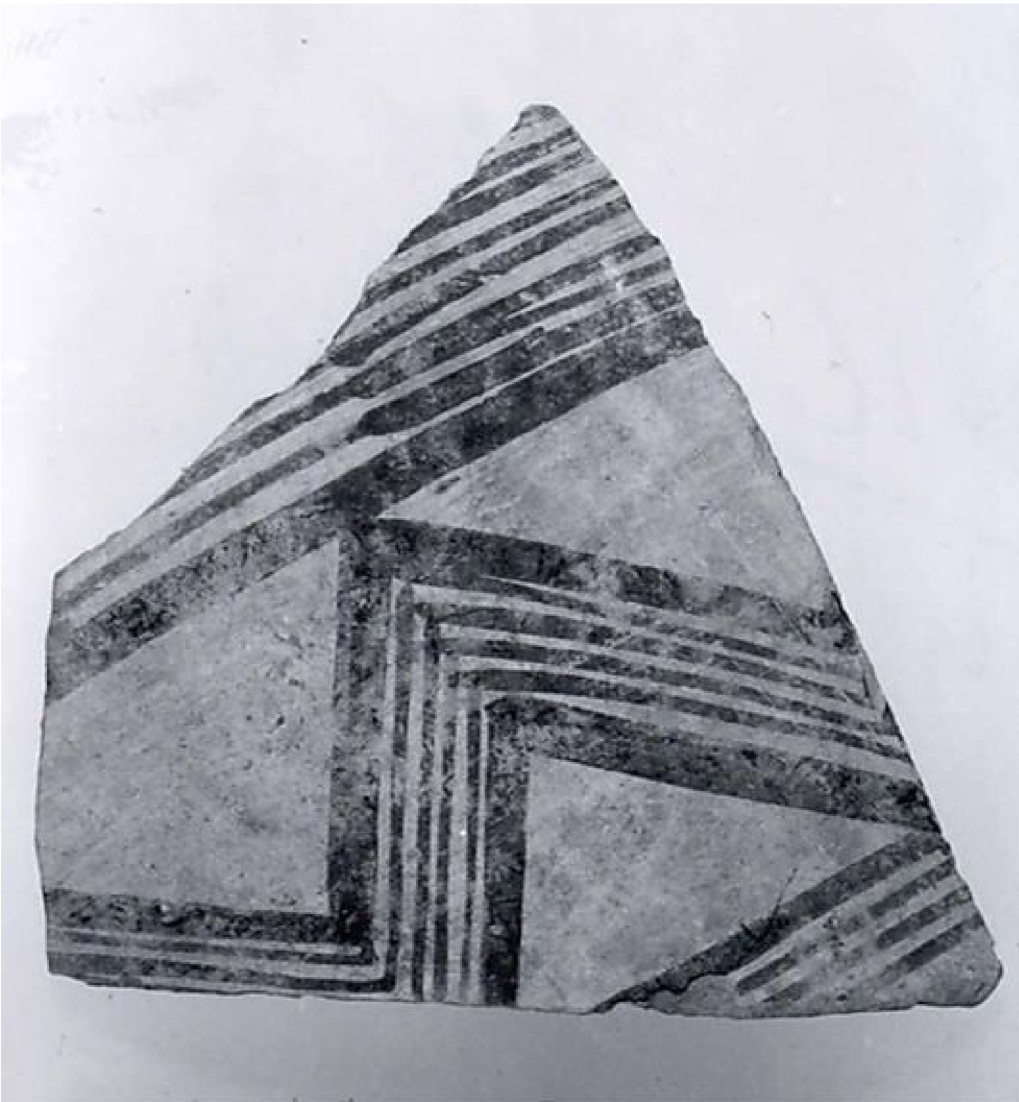
During this period, the society started to generate a substantial 'surplus', which promoted craft and trade. This was partly due to the use of bullocks to pull the plough for cultivation and the oxdriven cart for transportation. The surplus food production was also helped by the introduction of summer crops, notably *Bajra* and *Jawar* to compliment the winter crops, that is barley and wheat. The millet crops reached the Indus valley from East Africa through the Iranian plateau or through coastal contacts. Some of the villages became extraordinary large which indicates the beginning of an incipient urban culture and a foundation on which owns and cities of the Indus Civilization were to rise.

In addition to the development in agriculture, this period saw considerable improvement in technology. Stone tools were still being employed but they were slowly being supplemented with those of copper. Micro-drilling techniques reached a new height, as is evident from the beads and ornaments produced in this era. Houses were built with sundried bricks with frequent stone foundations. There is no evidence, however, of the use of baked bricks. The developments in pottery making continued, pottery paintings became, however, less sophisticated although forms and styles multiplied.

The Early Indus stage can be viewed as a period of consolidation and maturation of village farming communities all over Pakistan, their growth, and their expansion. Alternatively, it can be viewed in terms of the development of incipient urbanization and all that goes with it. This includes improvements in technology, increase in trade and exchange, intensification of specialization, and high concentration of population at some key sites. These changes have been discussed in some details in the next two chapters. A separate chapter deals with the developments in the borderlands. This will complete the story of Indus man from the Stone Age up to the time when he is poised to enter an urban civilization.

The developments in the Early Harappan stage can be looked upon in terms of the following five regional cultures, which are more or less contemporary to each other and nominally cover a time period between 3,500 BC and 2,500 BC. The next two chapters describe these cultural phases. 1) Damb Sadaat Phase
2) Amri Phase
3) Nal Phase
4) Kot Diji Phase
5) Kulli Phase

VI.5. Villages and Towns of the Early Harappan – I



The material available for the Early Harappan Period is large and we divide it into two chapters. In this chapter we shall review the Damb Saadat, Amri, and Nal phases, deferring the treatment of Kot Diji and Kulli phases to the next chapter. The reader should be reminded again that all of these phases are more or less contemporary to each other and their geographical boundaries are rather fuzzy and somewhat ill-defined. Although these cultures are regionspecific, their differences are not as stark as the term ‘regionalization period‘ implies.

In addition, there are a few other regional cultures that developed in the borderlands, the most talked-about of which are the so-called Sothi-Siswal Phase on the northeast side of the Pakistan’s borders, Bagor Pastoral culture across the Thar Desert, Northern Neolithic Phase to the North, and Helmand Cultural Phase in the Southeast of Afghanistan, particularly in the Kandhar region. These borderline cultures will be taken up in a separate chapter at the end of this Section.

Damb Sadaat is the hilly manifestation of the mature agricultural villages and towns in the Greater Indus Region. It is concentrated in and around the Quetta Valley and spreading to the Kandhar region in southern Afghanistan as well as to Shahr-e-Sokhta region in northern Iran. The Zhob and Lorai valleys are considered under its influence and some archaeologists would expand its geographical area almost into the Kalat plateau. The Amri and the Nal phases are quite similar and they cover a contiguous area of the central and southeastern regions of Baluchistan and southwestern regions of Sindh. They can, thus, be described and analyzed together.

DAMB SADAAT PHASE or THE QUETTA VALLEY CULTURE

The Damb Sadaat Phase, sometimes also identified as the Quetta Valley Culture, is centered in the Quetta Valley. It rests on a long history of occupation in the fertile and well-watered region of northern and central Baluchistan, centered in this.The Quetta Valley is blessed with substantial subsurface water resources, available even to relatively primitive cultivators in the form of artesian springs. This valley is also the center of a natural corridor linking southern Afghanistan to the Indus Valley via the Bolan and Khojak passes. Historically these factors have made it a regional hub of settlement, trade and travel. In the Early Harappan period under consideration a distinctive set of archaeological assemblages developed in Quetta-Pishin and the valleys to the immediate south and north beyond into Afghanistan at the famous site of Mundigak, even reaching Shahr-e-Sokhta in Siestan. Because of a strong cultural affinity between the Quetta Valley, the Kandhar region, and Shar-eSokhta, this region has sometimes been treated as one cultural unit and identified as Helmand Cultural Phase.

The distribution of Damb Sadaat sites is interesting. There is a cluster of them in QuettaPishin valley and more settlements down the Bolan Pass to Kachi. They are found in the valleys to the east, such as Zhob and Loralai regions. Some sites have also been discovered in Kalat plateau, one such place being Isplenji. A few sites, representing a culture similar to the Damb Sadaat phase are in the Registan Desert, the pottery of which is sometimes referred to as Dasht tradition. Across the Khojak Pass, it is found at Said Qala and Deh Morasi Ghundai and then Mundigak across the border in Afghanistan. A ceramics variety occurs in Siestan, principally at Shahr-e-Sokhta. This distribution has an interesting funnel-like shape, with Quetta-Pishin at the base and the narrow neck projecting down the Bolan Pass to Kachi and the Indus Plains. The cup of the funnel hold Siestan, the Kandhar region extends north to Turkestan (25).

At least thirty-seven sites represent this phase in the Quetta Valley, and they are scattered throughout the valley wherever soil and water resources are combined to produce a good basis for agriculture (25). At the heart of Quetta city stands the Miri, a landmark in the midst of the plain. Its surface is strewn with the Quetta Ware, suggesting that a good part of the site was occupied during the Damb Sadaat period. The next largest size, Mundigak, accross the border in east Afghanistan, is 18.7 hectares. It is in the Kushk-i-Naked Valley of the Helmand River drainage over 200 km to the northwest of the Miri. Mundigak was a town during the Early Harappan times, here seen as the end of Mundigak Period III and the beginning of Mundigak IV. The ceramics and other finds at Mundigak III/IV have wide ranging parallels with surrounding regions, including central Asia. But, from the beginning the closest relationships are clearly with the Quetta Valley and central Baluchistan. The site marks the western limit of settlements with the Baluchi archaeological assemblages. Shahr-iSokhta is outside this fold in spite of many parallels in material culture with Baluchistan.

This phase, like the Early Harappan Stage in general, show the growth of villages to maximum size. For example, the site of Faiz Muhammad consist of five sub-mounds covering an area about two hundred by one hundred yards. There are eight excavated Damb Saadat sites and more than a dozen

Early Indus—II!radiocarbon dates are available. With the exceptions of one or two, these dates correspond well
with the chronology of the Early Harappan Stage
Quetta-Pishin valley and more settlements down the Bolan Pass to Kachi. They proposed by Possehl, i.e.

between 3500 and 2600are found in the valleys to the east, such as Zhob and Loralai regions. Some sites
BC. The following brief notes on a few important
have also been discovered in Kalat plateau, one such place being Isplenji. A few
sites along with appropriate illustrations should pro

sites, representing a culture similar to the Damb Sadaat phase are in the Registan vide the material on this cultural phase.
Desert, the pottery of which is sometimes referred to as Dasht tradition. Across

the Khojak Pass, it is found at Said Qala and Deh Morasi Ghundai and then Mundigak. A ceramics variety occurs in Siestan, principally at Shahr-e-Sokhta. This distribution has an interest ing funnel-like shape, with Quetta-Pishin at the base and the narrow neck projecting down the Bolan Pass to Kachi and the Indus Plains. The cup of the funnel hold Siestan, the Kandhar region and extends north



Map of sites of Damb Sadaat Phase (after Possehl)

to Turkestan. **Map of Damb Saadat Phase or the Quetta Valley Culture Damb Sadaat:(***after Possehl***)**
The Damb Sadaat cultural phase is named after the type site of the same name in

the Quetta valley. The initial occupation of Damb Sadaat, as outlined in Chapter
Damb Sadaat: Damb Saadat, the type site,

5, is marked by the presence of the same suite of ceramics that characterized the is one of the most important archaeological sites in final occupation of Kili Ghul Muhammad. The subsequent occupation (DambBaluchistan. It was first investigated as a part of the Sadaat II and III) shows considerable continuity but is characterized by theprogram of the Second Afghanistan Expedition from

the American Museum of Natural History under the
predominance of a typical pottery, commonly known as the Quetta Wares. This direction of Walter A. Fairservis. Damb Sadaat is

Page 253 important for two reasons. Just as at Kuli Gul Muhammad, it documents the continuity of occupation in this region of Baluchistan, one of the most important gateways to the plains of the Indus Valley. Damb Saadat also documents significant culture historical interactions between Pakistan and northern Afghanistan as well as central Asia during this crucial time period in continuation with the early settlements of the Neolithic stage.

The initial occupation of Damb Saadat, the DS-I, is marked by the presence of the same suite of ceramics that characterized the final occupation of Kili Gul Muhammad. The subsequent occupation (DS-II and DS-III) shows considerable continuity with DS-I but is characterized by the predominance of a typical pottery, commonly known as the Quetta Wares. This type of pottery, which consists of blackon-buff wares, has not been present in the earlier times.

Calibrated chronology of Damb Sadaat II seems to show a broad range with ca. 3000 BC as the central point. It is also important to note that, according to Fairservis, the Indus Civilization *could* be contemporary with the upper levels of Damb Sadaat II or at least the upper levels of Damb Sadaat III. He provides the evidence in the form of fragments of thumb-nail incised pottery, perforated pottery, pipal leaf decoration on grey sherd and bird figurines. He also notes that settlements in the Quetta valley seem to be very extensive in the DSIIDSIII times: ‘sites occur almost everywhere in the valley where fertile soil and water exist today, indicating that climatic conditions and ecology of the modern Quetta valley are comparable to those of prehistoric tims’.

Mehrgarh V-VII: The settlement of Mehrgarh has been adequately covered in the previous Section. Its Period V and VI fall in the chronology of the time period covered in this chapter, while the last period, Period VIII, is decidedly Harappan. The pottery decoration of Period V shows the influence of the Quetta Ware, mixed with Nal polychrome elements to be described subsequently. This influence is visible even in Period IV. The Period VI represents a mixture of late Quetta Ware and Kot Diji Ware. Male and female figurines are abundant in both of these periods. An interesting observation in Period VI has been that almost 50 percent of the painted pottery is red ware decorated with pipal leaves. Well-fired grey ware makes its appearance, and there is evidence of interregional pottery styles. A large kiln provides evidence of ceramic production for market, which can be taken as a hallmark of incipient urbanization. Terracotta figurines with ornate hair styles, round and heavy breasts, and joint legs form a very distinct component of this time.

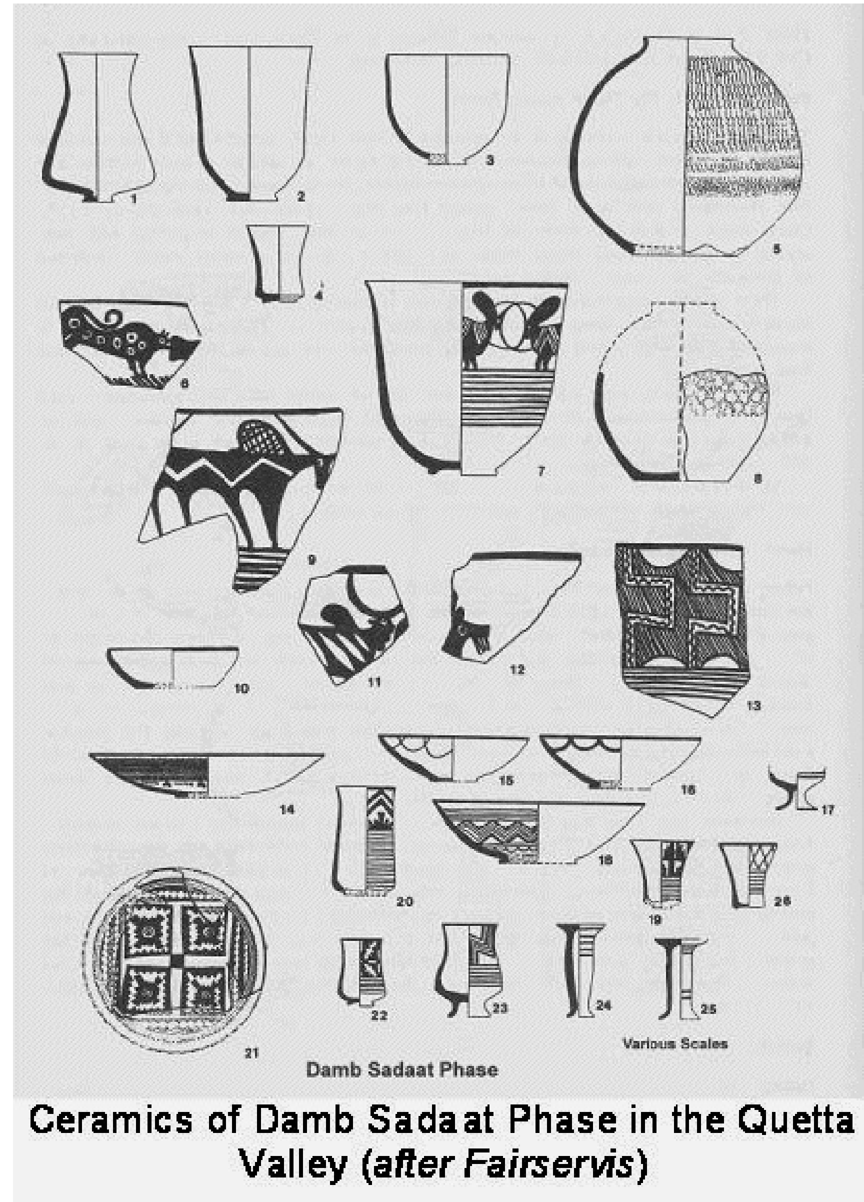
The Kalat Plateau *:* South of the Quetta Valley proper, the prehistoric farmers settled on the shores of the ponds which are created by internal drainage. That the sites such as Gwandin and Isplenji were successful is proven by the representation at such sites of almost all phases found in the Quetta sequence, including the Damb Sadaat phase. This story can be repeated west of the valley as well as at Panjpal, Mastung, and Nusshki. Sites essentially of the Quetta valley time range and type

3000 BC as the central point. It is also important to note that, according to

are found with frequency as far south as Kalat. The Sohrab area of the Kalat Plateau has been the main focus of archaeological attention. It lies south- southwest of Kalat, a principal point on the

communication lines between north and south Baluchistan. On the basis of her work at two sites, Anjira and Siah Damb, Beatrice de Cardi built up a composite sequence of occupation for the area that shows later levels of its culture related to Quetta Valley, generally DS II and DS III.
IV. Leaf-shaped stone arrow points and one of bronze and more magnificient bull figurines of terracotta are also characteristics of this period. A fine black-on-red pottery also occurs, some of which suggests the Harappan influence. At Mughal Ghun[Early Indus—II]!dai, essentially the same picture emerges, including
the presence of the Zhob mother godesses and bull figurines amid the ruins of what once had been a structure made of boulders.

To the south of the Zhob valley is the district of Loralai, in the basin of Anambar River. Here are the Indus



Ceramics of Damb Sadaat Phase in the Quetta Valley (*after Fairservis*)

three well-known sites: Rana Ghundai, Sur Jungal, *could*
be
and Dabar Kot, but there are numerous others. Da

bar Kot is certainly the largest site of its kind in Baluchistan. Aurel Stein made a test excavation which revealed the presence of a mud-brick building equipped with drains, which were partially made by using fired brick. Associated with this building was

form of the familiar Zhob mother godesses as well as com thumb-nail partmented seals, clay bangles, and a potsherd of perforated

Harappan type. This association suggests that the the contemporaneity of the Harappan type or a prelude to the Harappan.

and
bird

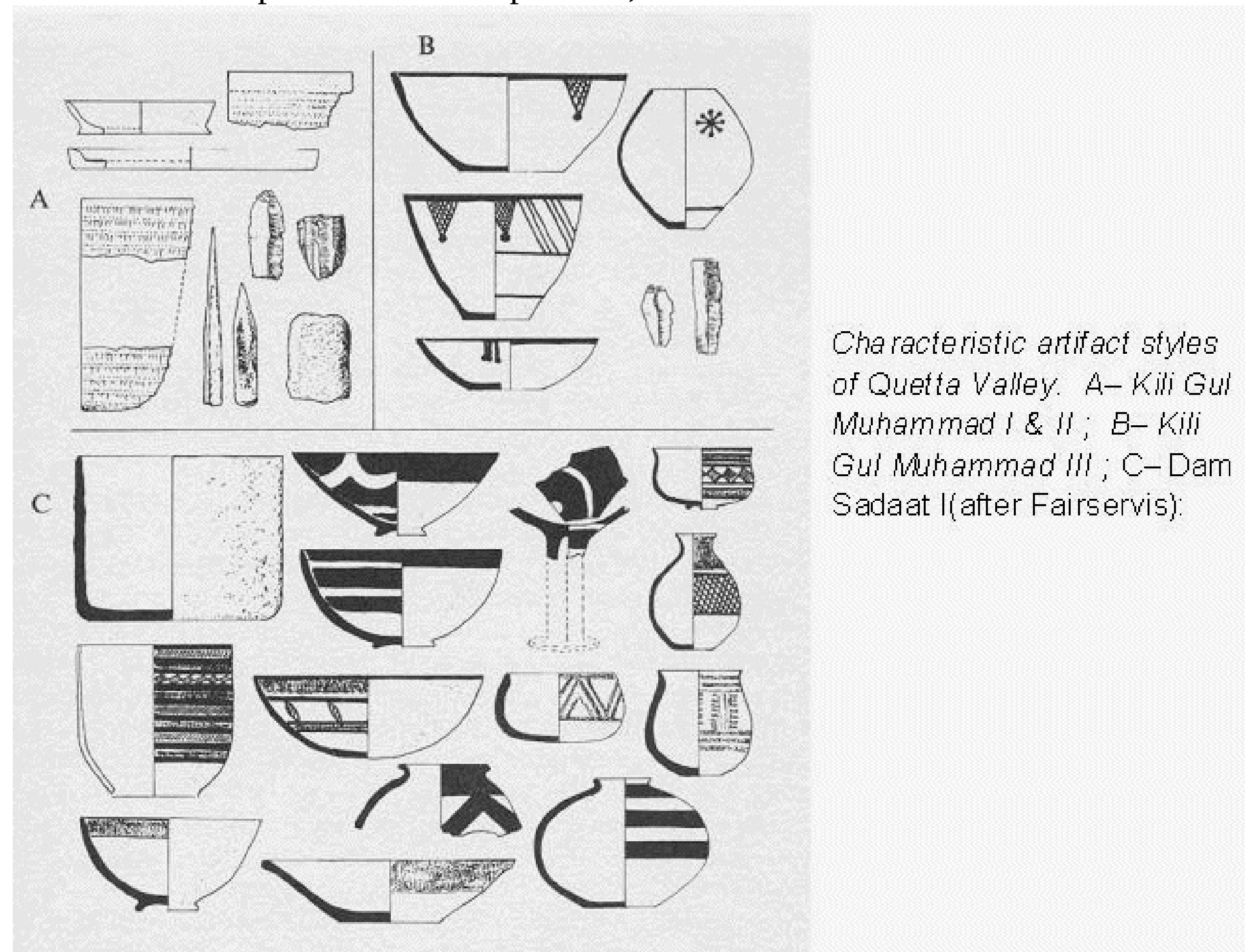
In the midst of the narrow Baghnao Valley of the Thal River is the little site of Sur Jungle. Of the Quetta the three occupation levels, the last equates to a

be
very

late phase of the occupation at Damb Saadat. Not only are the ceramic analogues precise but in addition there are familiar objects such as model houses

almost and the Zhob mother goddess to confirm this corre the valley lation. The excavations of the nearby site of Rana soil and water Ghundai provided ample evidence that its sequence

that
is directly parallel to that of Sur Jungle.
Artifacts: Compartmented stamps seals, nditions and



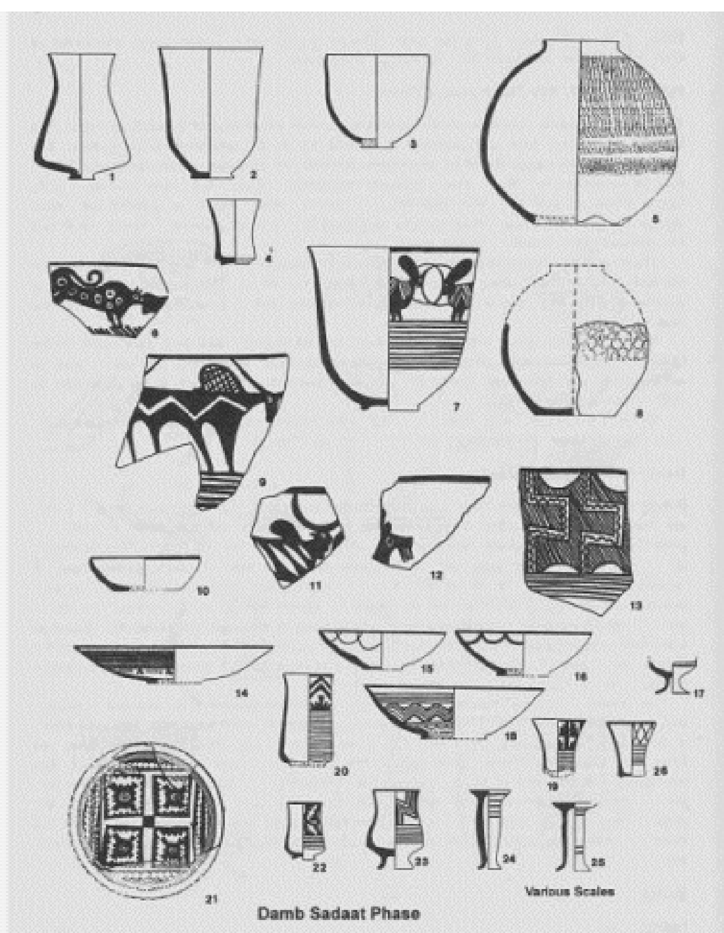
Characteristic artifact styles of Quetta Valley. A– Kili Gul Muhammad I & II ; B– Kili Gul Muhammad III ; C– Dam Sadaat I(after Fairservis):

Ceramics of Damb Sadaat Phase in the

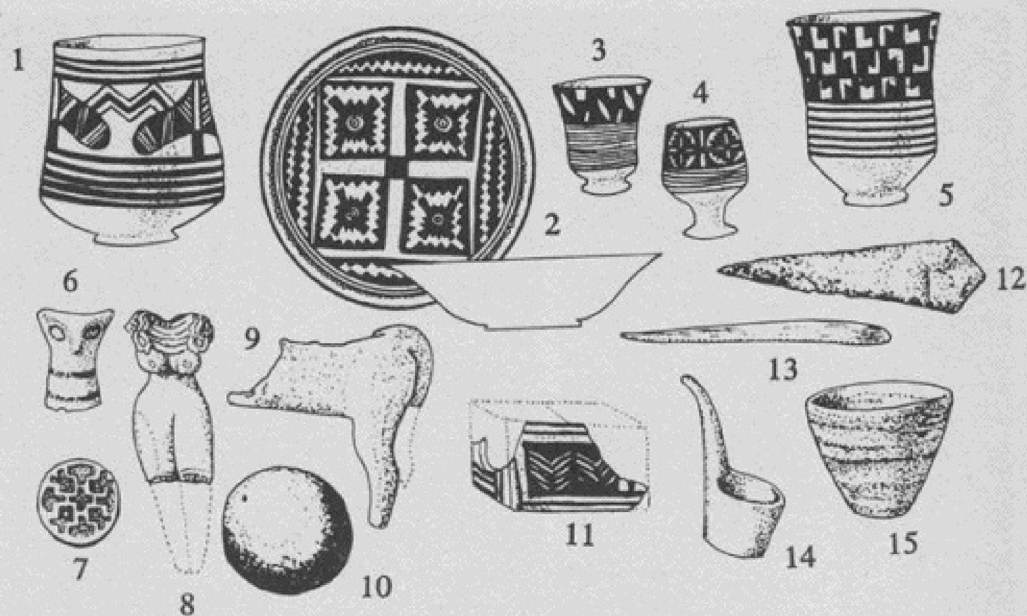
Quetta Valley

Zhob and Loralai Sub-culture:

[Page 255]In the districts of Loralai and Zhob, to the east of the Quetta valley, the story, insofar as archaeological evidence is concerned, is essentially the same as in Quetta. In the Fort Sandeman area, near the junction of the Zhob River with the Gomal, two sites of prehistoric time are well known: Periano Ghundai and Mughal Ghundai. Fairservis excavated these sites and uncovered two late phases that relate to the Dam Sadaat III phase. He names them Zhob Cult phase and the Incinerary Pot phase. The latter is characterized by the burial of individuals in vessels after disarticula tion and some cremation. These burials were in the floors of houses.



Ceramics of Damb Sadaat Phase in the Quetta Valley (*after Fairservis*)



Characteristic artifacts at Dam Sadaat II, Quetta Valley
(*after Fairservis*)

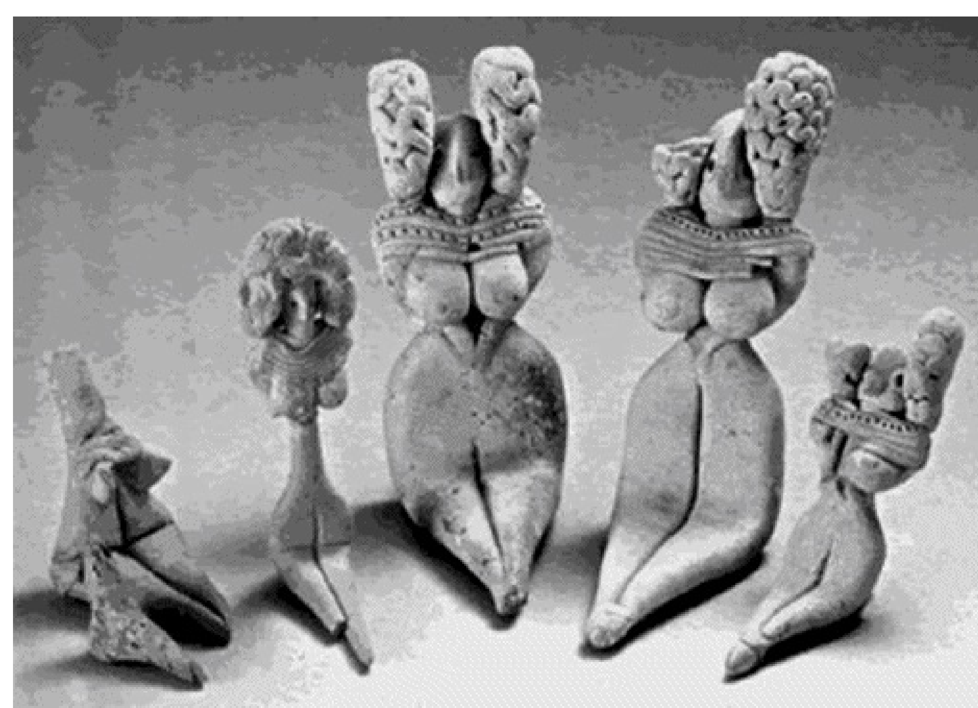
Characteristic artifacts at Damb Sadaat II, Quetta Valley

(*after Fairservis*)

Characteristic artifacts from Damb Saadat II, Quetta Valley
such sites of almost all phases found in the Quetta sequence, including the
(after Fairservis)
Damb Sadaat phase. This story can be repeated west of the valley as well as at
animal figurines, chipped and ground stone objects,
Panjpal, Mastung, and Nusshki. Sites essentially of the Quetta valley time range
clay sling balls, copper, and of course, the Quetta The Zhob cult phase is characterized by theand type
are found with frequency as far south as Kalat. The Sohrab area of the

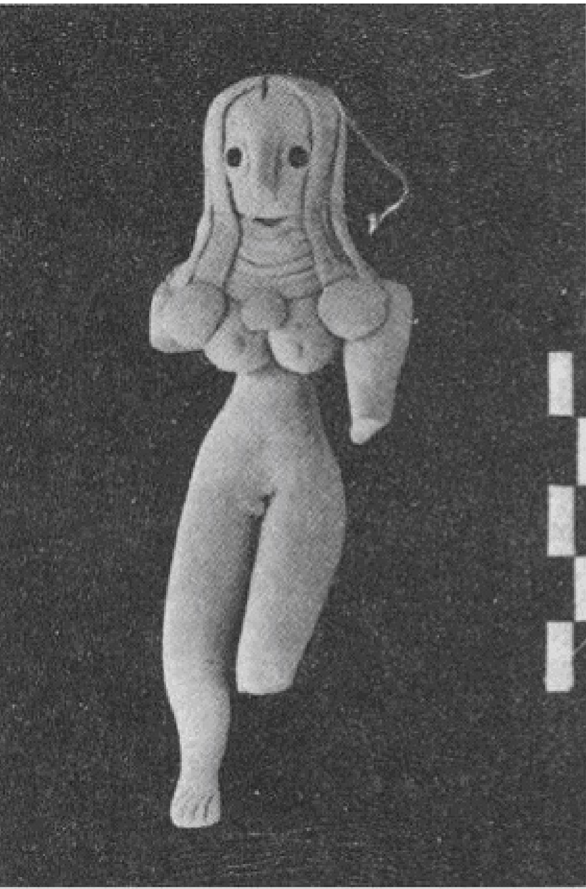
presence of the same goggle-eyed, hooded femaleWare pottery general characterize this phase at figurines known in Damb Sadaat III and Mundigak
Damb Sadaat. They have their analogues in the Kandhar site, as they do at Rana Ghundai, Sur

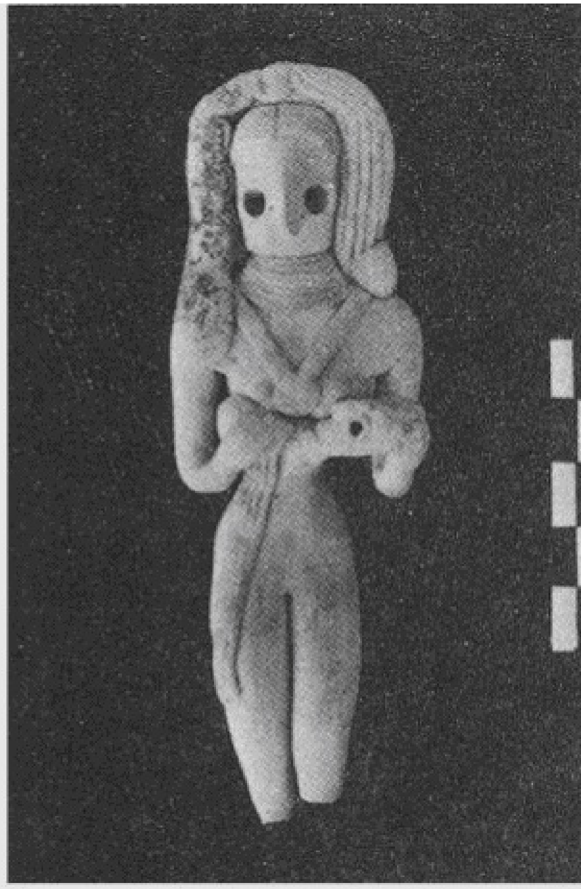
418 Page 257



Jungal, and Dabar Kot in Loralai, and at Periano
Ghundai near Fort Sandeman in the Zhob district to

Early Indus—II !the east. Model houses, clay rattles, stamp seals,
copper, alabaster cups, and a repertoire of pottery
occur as early as the first phase of the Kechi Beg ware, but by this time they are very common. They consist of marks on the exterior or base parts of vessel either by means of an engraving instrumentEarly Indus—II**!**





Goggle-eyed 'mother goddess' figurines from Mehrgarh. Notice the similarities between these gigures and the so-called mother-goddesses of Zhob-Loralai

vessels which, though it
includes much of the



earlier Quetta Ware

typestypes, form, and de
design, sign. The appearanceto
of characteristic figuare

common to the
period. This period
is the last major
Early Indus phase in
the valley

Two other groups of
objects make their
appearance in this

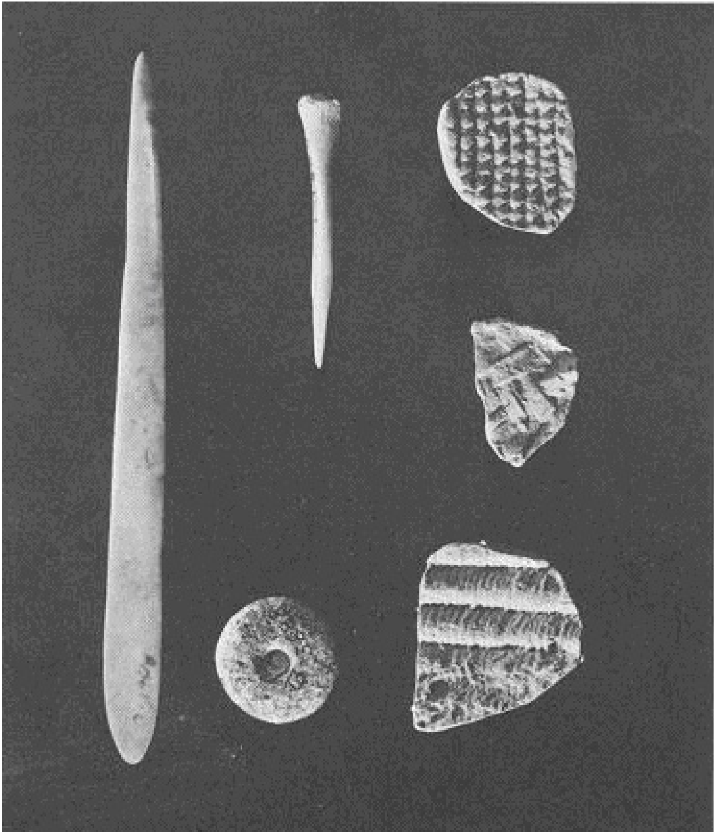
Female Figurine found near phase. The first is
Female figurine found that of figurines of

near the surface at Damb (*after* human females and **Saadat** (after Fairservis) **)** of cattle. The former
or simply by the use of the finger nails. Some of the signs are quite complex and are similar to certain

signs
found
in
the
group consists of largely of Harappan Civilization script.
delicately
These potters' marks are repeated not only within
modeled
successive levels within the sites excavated but as
tend terracotta pieces an inch or
Early Indus—II
!
far afield as the site of Periano Ghundai near Fort

simplification somewhat more in size. The figures are full breasted and distinguished by the depiction of heavy necklaces and strands of hair reaching to the top of the breasts and made by the

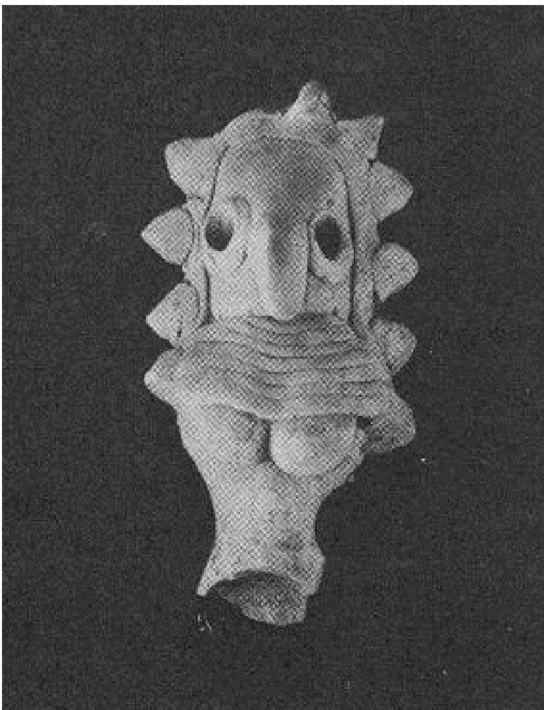
the surface at Damb Sadaat, appliqué methods. The legs Quetta Valleu are bent forward at the knee
Fairservis
and are footless and end in a



Indications of weaving from the site of Damb Sadaat II, Quetta

(after Lee Boltin)

Kechi Beg ware (see the objects make their



"Zhob Mother Goddess" figurine found at Fort Sandeman

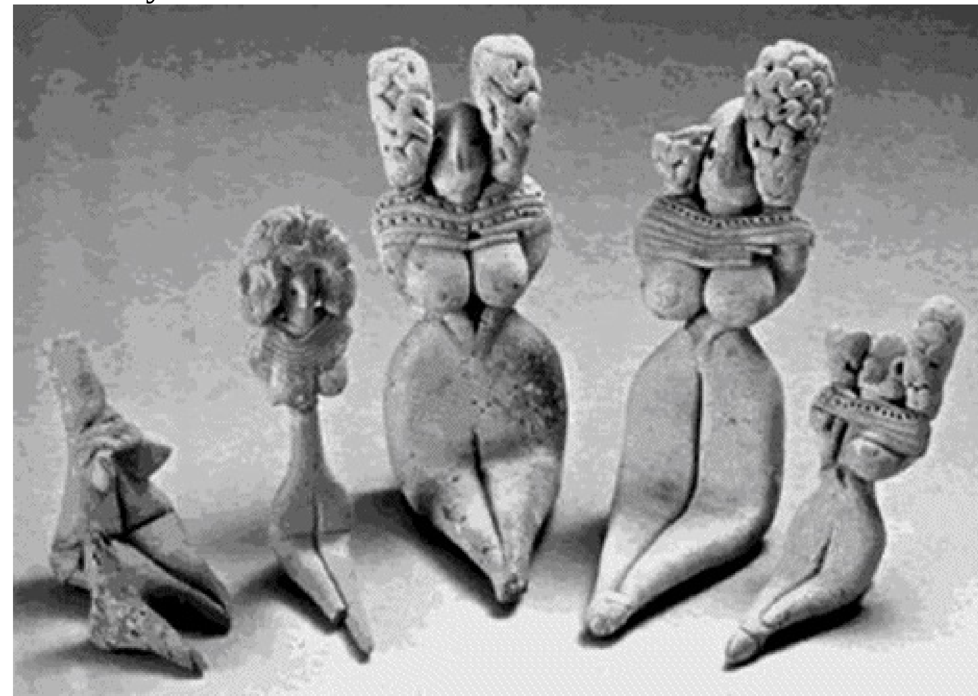
(after Fairservis)

Page 263 rather grotesque tapering types of form and design, tend to fashion.
simplification

are

common to the The second group of object period. This period s is that of the potters' is the last major
Early Indus phase in marks. These first occur as

the valley


early as the first phase of the

Two other groups of **Zhob Valley "goddesses" from the Damb Saadat Phase**

appearance in this them Zhob Cult phase and the Incinerary Pot

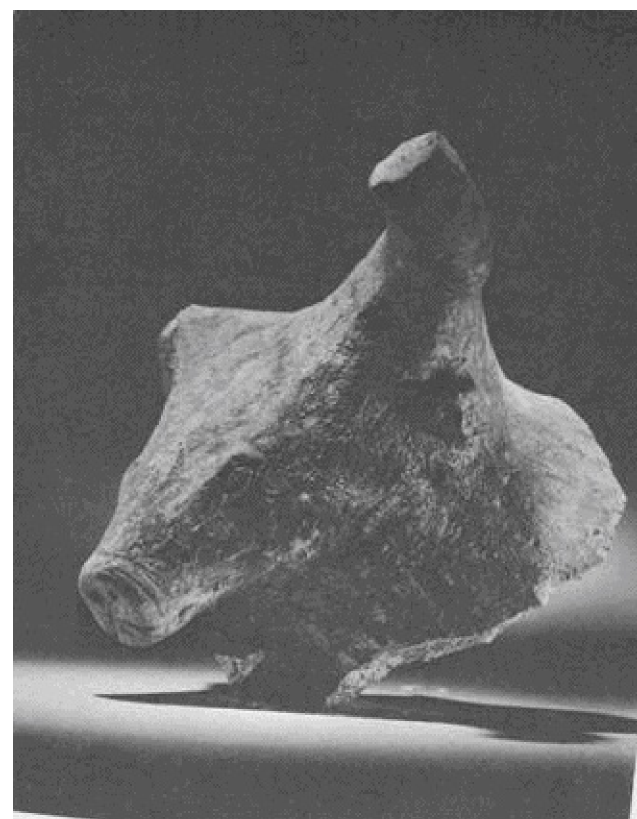
phase. The first is rines of phase. The latter human fe is characterized by the
that of figurines of
human females and **Zhob "mother goddess"**
of cattle. The former **figurine found at Fort**

Sandeman (after Fairservis)

burial malesof andindividuals cattle in vessels after
has already been men
disarticulation and some cremation. These common. They consist of marks on the group consists of burials were in the floors of houses. The
largely of delicately Zhob cult phase, the earlier, is characterized exterior or base parts of vessel either by
modeled terracotta
by the presence of the same goggle-eyed, means of an p i e c e s a n i n c h o r hooded female figurines known in Damb simply by the use of the finger nails. SomeSadaat III and Mundigak IV. Leaf-shaped of the signs are quite complex and arestone arrow points and one of bronze and similar to certain signs found in the more magnificient bull figurines of terracotta Harappan civilization script. These potters' are also characteristics of this period. A fine
strands of hair reaching marks are
and made by the appli

which suggests the Harappan influence. At successive levels within the sites excavated but as far afield as the site of Periano Ghundai near Fprt Sandeman and, of course, are known for all phases of Period

IV at Mundigak, though it appears they are most common in the Quetta area. Taking a



Bull head found at Periano Ghundai, near Fort Sandeman, Zohob District (*after Fairservis)*

Chpater 6), but by this time they are very

tioned. The former
is characterized by the



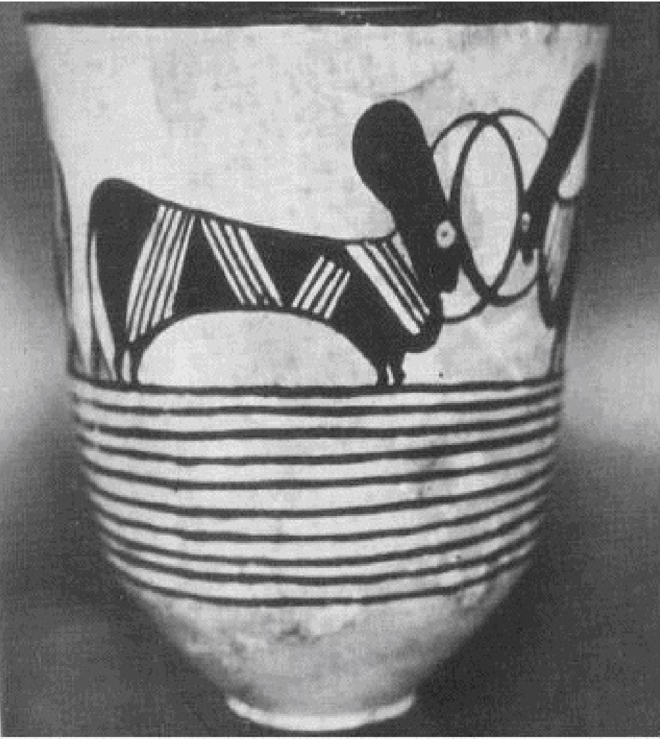
Bull head found at Periano Ghundai, near Fort Sandeman, Zohob District (*after Fairservis*)

somewhat more in size.

in vessels after The figures are full
guished by the depiction
of heavy necklaces and
black-on-red pottery also occurs, some of
to the top of the breasts
Ghundai,

essentially the same **A bull head found at Perinea Ghundai, nurser** An important group of **Fort Sandeman, Zhob** objects is that of the pot**District (*after Fairservis*)** ters' marks. These first

Mughal qué methods. The legs essentially the same
are bent forward at the
knee and are footless picture emerges, including the presence of
the Zhob mother godesses and bull figurines
tesque tapering fashion.


The Bull Pot in Quetta Ware from Damb Sadaat II

amid the ruins of what once had been a**A bull painted Quetta Ware from Damb Saadat**

II, found at Periano Ghundai, near Fort Sandeman, Zhob District (*after Fairservis*)
Page 260

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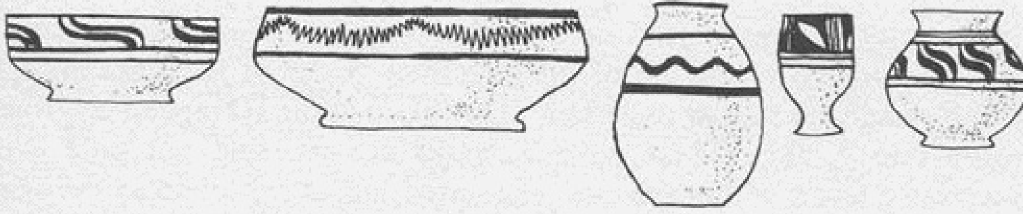
Sandeman and Mundigak, though they are most common in the Quetta area. Taking a bird-eye view, the potters' marked appear in the Kechi Beg phase, abound in Damb Sadaat phase, and still exist at some sites in Kot Diji phase. The geographical area they cover is immense, starting from central Baluchistan and going to the Quetta- Zhob-Loralai and spreading to as far as Rehman Dheri.

The significance of these potters' marks is that they represent a system of mutually intelligible symbols commonly accepted through time and space. They are a step more advanced than the pottery painting because, contrary to the pottery paintings, the potters' marks are hardly decorative. They suggest concepts such as trade-mark, personal possession, place or person of manufacture, or even shamanic symbols of good luck. They,
however, cannot be construed as 'writing', as some with a series of concentric lines capped at the rim by a single line of loops. The lines surmount the lower portion of the bowl and plate, which is painted with a variety of geometric or naturalistic motifs. Among the latter are fish, birds, snakes, and papal leaves - none of which are depicted in comparable painted pottery in the Iranian area to the west.

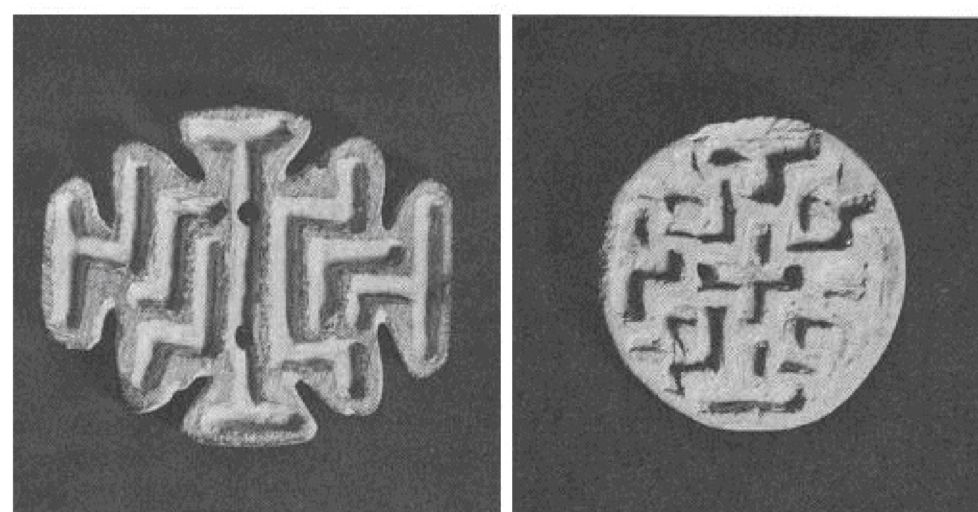
Another type of painted pottery is from the Registan or Dasht area, which is adjacent to the Quetta Valley, to the southwest. Dash tradition is similar to the Quetta Ware but seems to be more affiliated to the motives that were prevalent at the time in southern Turkmenia. Although some archaeologists have treated it as a distinct variant of the Quetta Ware, there is a general tendency to lump this

tradition with the Quetta Ware. There are not enough samples to make a sound judgment.

The pottery of Damb Saadat Phase if often archaeologists have speculated.Calibrated chronology of Damb Sadaat II seems to show a broad range with c.confused with the Quetta Ware pottery. In reality, 3000 BC as the central point. It is also important to note that, according tothe Quetta Ware is the hallmark of Damb Dadaat



Pottery of Damb Sadaat III, Quetta Valley
(after Fairservis)



Clay stamps of Early Indus seals from Quetta Valley (DS II)

(after Fairservis)

Period II and III and almost contemporary with the Mature Harappan Civilization but still not a part of the Harappan pottery tradition. Its area of distribution is large.Early Indus—II**!**

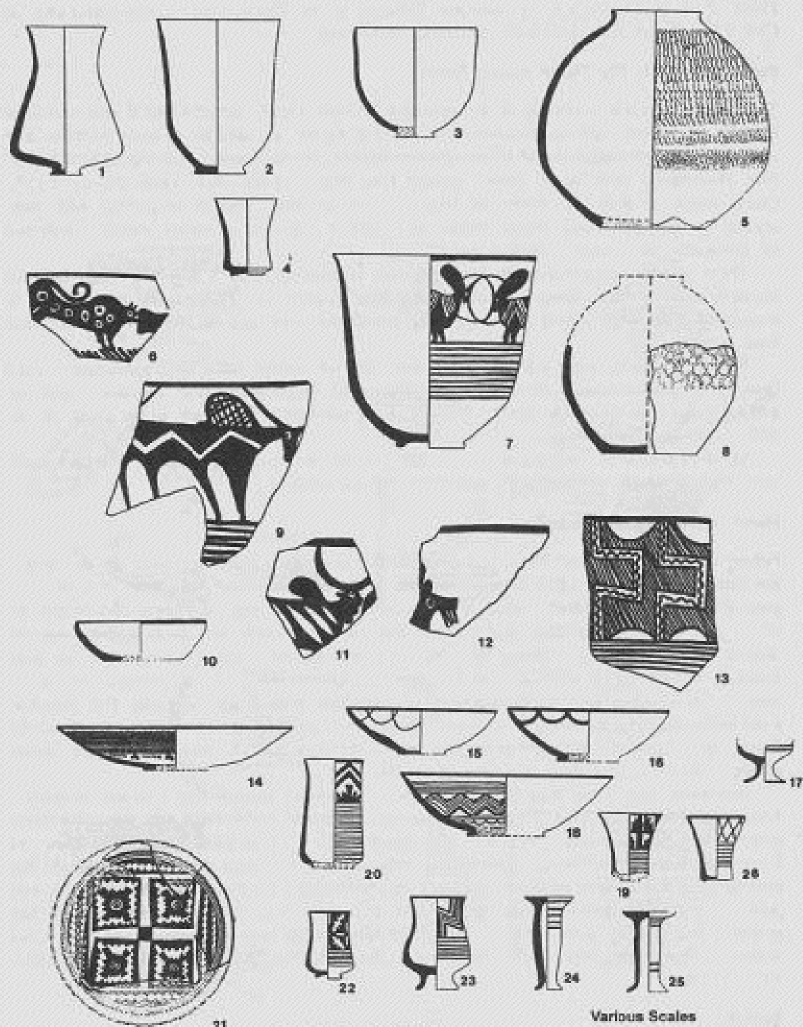
group consists of largely of
delicately modeled
terracotta pieces an inch or
somewhat more in size. The

Fairservis,
the
Indus
figures are full breasted and
Indications of weaving frtom the site of Damb Saadat II,
civilization *could* be (after Lee Boltin)distinguished by the contemporary with the upper depiction of heavylevels of Damb

Sadaat II or at There is some architecture innecklaces and strands of
Sadaat III. He provides the
Damb Sadaat II. This architecture is much more
hair reaching to the top of
evidence in the form ofpronounced in Damb Sadaat III. The houses of the
period were well-made mud-brick structures conthe breasts and made by the
sisting of several small rooms. Slabs of limestoneappliqué methods. The legs
were used in wall foundations frequently. In some ofare bent forward at the knee
these houses both fire pits and ovens were located,
figurines. He also notes that and are footless and end in a*Tan*
*door*settlements in the Quetta rather grotesque tapering valley seem to currently used throughout Pakistan and
the
be
very
latter seems to be a precursor of afashion. *Dash* which is extensive in the DS II-DM III currently common in Quetta and
Kandhar area. Thetimes: ‘sites occur almost
final period of Damb Sadaat phase in Quetta valley The second group of object everywhere in the valley

is best represented by the construction of monus is that of the potters’ where fertile soil and water
exist today, indicating thatmental buildings located on the highest part of

climatic
co
nditions
Damb Sadaat. The houses of mud brick in Zhobmarks. These first occur as
and
and Loralai valleys suggests the Zhob cult’s conearly as the first phase of the
temporaneity with at least one phase of that urbanKechi Beg ware (see theculture.of prehistoric tims’.



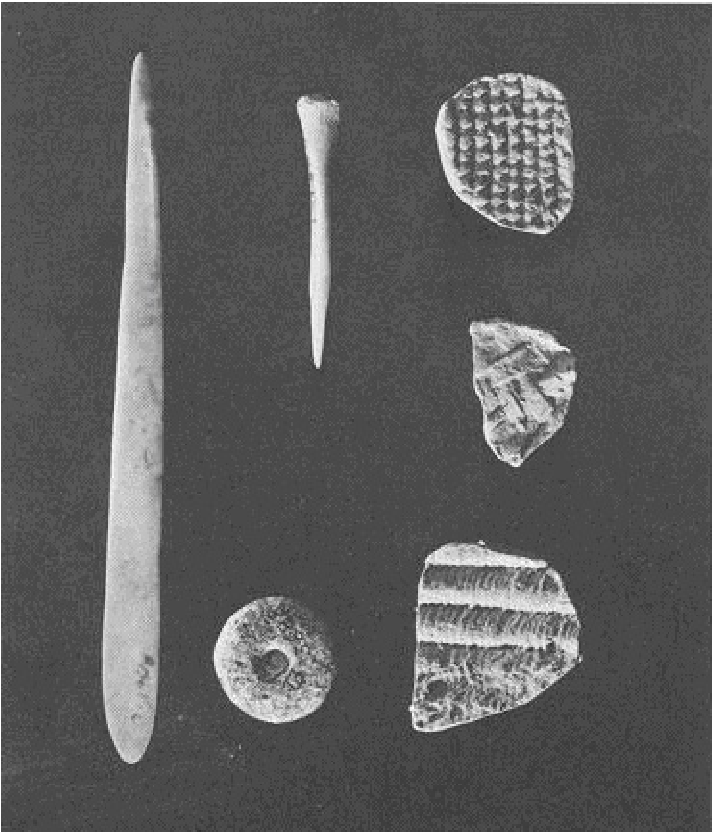
Ceramics of Damb Sadaat Phase in the Quetta Valley (*after Fairservis*)

Quertta Valley

Architecture:

least the upper levels of Damb

the former construction appears to be like a



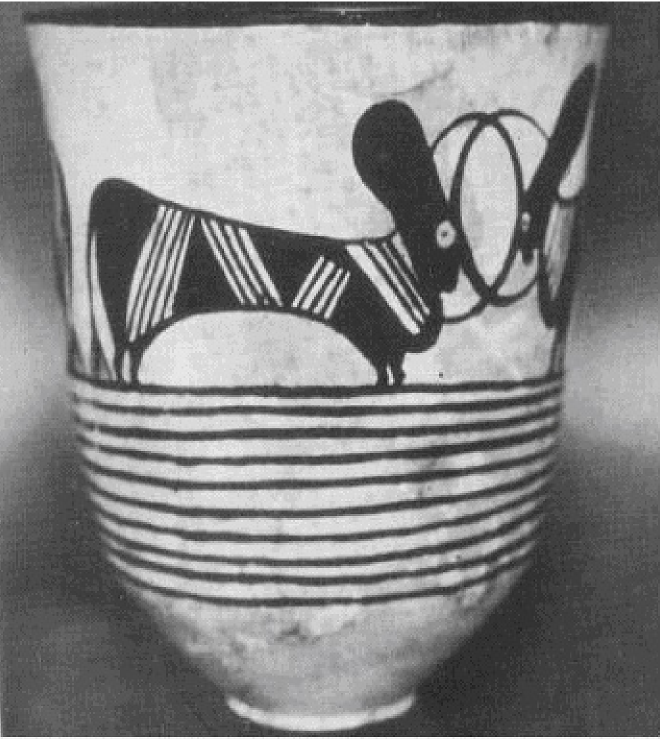
Indications of weaving from the site of Damb Sadaat II, Quetta

(after Lee Boltin)

ecology of the modern Quetta
valley are comparable to those
Clay stamps of the Early Harappan Phase in the Quetta Valley, Damb Saadat II (*After Fairservis***)**
The Pottery: Much of the Damb Sadaat
pottery is a buff ware, occasionally slightly pink. It

was often slipped to create a uniform surface, even if it was not painted. Painted pottery is the most characteristic of this phase and is commonly known as *Quetta Ware*. A ceramic known as Faiz Muhammad Grey Ware was also manufactured. It is a fine ware ceramic, generally rendered as deep, open bowls and shallow plates painted on their interior *Quetta Ware* is a striking and boldly decorated type of pottery of red-buff color, with a light slip, and decorated with black designs. Quetta Ware

Chpater 6), but by this time they are very
stands more-or-less on its own within the Early
common. They consist of marks on the Harappan Stage, and deserves special attention.
exterior or base parts of vessel either by
This importance is more so if we take into account the distribution of such pottery over an exceptionally
means of an engraving instrument or large area beyond the Greater Indus Valley, as the
simply by the use of the finger nails. Some
way to the southern central Asia. While we shall



The Bull Pot in Quetta Ware from Damb Sadaat II

of the signs are quite complex and are

similar to certain signs found in the Harappan civilization script. These potters' marks are repeated not only within

successive levels within the sites excavated

pottery paintings, the potters' marks are hardly decorative. They suggest concepts such as trade-mark, personal possession, place or person of

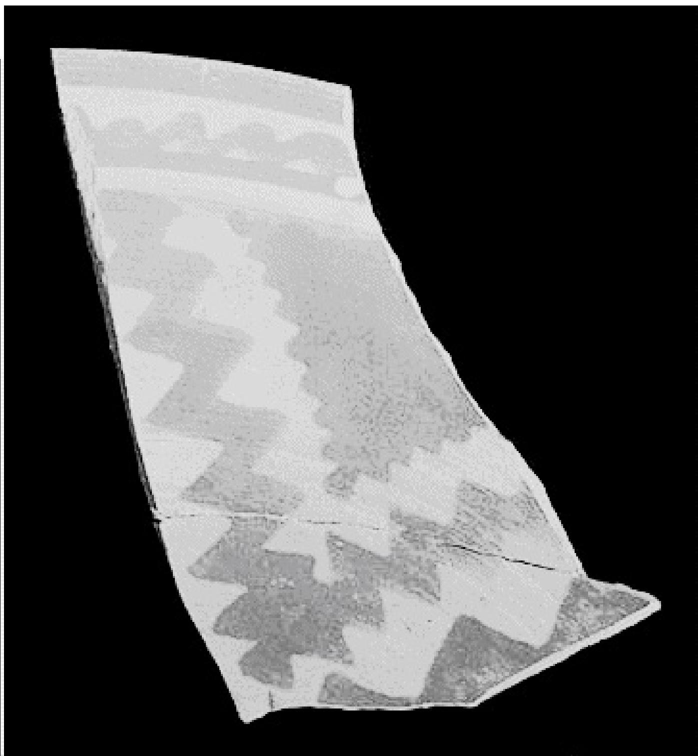
manufacture, or even shamanic symbols

of good luck.

used in its
is somewhat
Quetta Ware was first



Faiz Muhammad type pottery from Niai Buthi



Faiz Muhammad Grey pottery, Niai Buthi

Early Indus—II!

diamonds and zigzags, some of which look like lighting bolts, but the stepped cross is the distinctive motif. Close parallels to the Quetta Ware motifs from the Quetta Valley occur at many sites. They are found in Mehrgarh, Mundigak and Said Qala as well as Damb Saadat. They are also at Shahr-eSokhta and other sites in Siestan and interestingly enough in central Asia at places like Alyn Depe and the Geoksyur Oasis. It is important to note that

expanded bythe Harappan civilization. Between and amid are fore construction. Houses have a stone foundathese are versions of Quetta Ware and its motifs, as made by using fired brick. Associated with this building was the familiar Zhob the pottery types which were first identified by tion,but mud bricks were also used, the roof was

Stein at the site of Kulli, thelargest in Kolwa. The pottery originally proposed by Piggott and refined by Fairs at Mundigak and mother godesses as well as compartmented seals, clay bangles, and a potsherd of covered with mud-smeared reed. The pottery from earlier phases of the Niai Buthi I are related to the and Said Qala Harappan type. This association suggests that the same situation existed here as even if it was not the earlier occupation is very similar to that from

ceramic corpus familiar in the last phases of Early **Faiz Muhammad grey pottery from Niai Buthi, Las Bela** the earlier levels of Balakot I. wares are very close to those in the Quetta Valley Quetta Ware, but, at Periano Ghundai — the contemporaneity of the Harappan type or a prelude tobut that at Shahr-e-Sokhtsa and the central Asian Harappan occupation of such sites in the Indus **plains**
An AMS date run on charcoal suggests a
the Harappan.

dating into the very early third millennium BC. sites is definitely different and in some important After

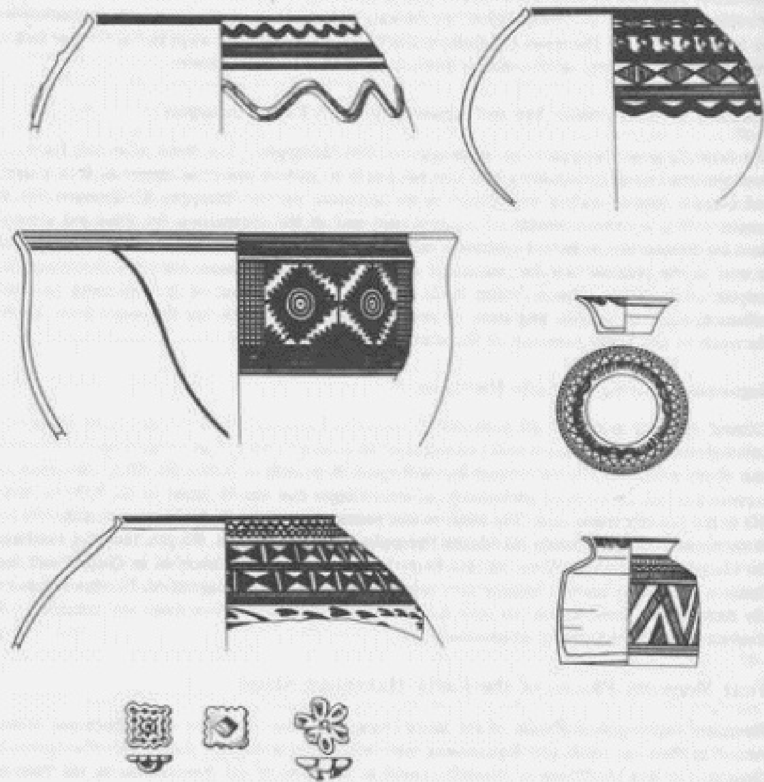
2700/2600ways (25).thethe site was abandoned.In the midst
The uppermost, badly preserved occupaAs discussed earlier, there are many ways narrow Baghnao Valley

tion, dates to the later Kulli period. Very small
of the Thal River is the to compare ceramics, but three of the most impor

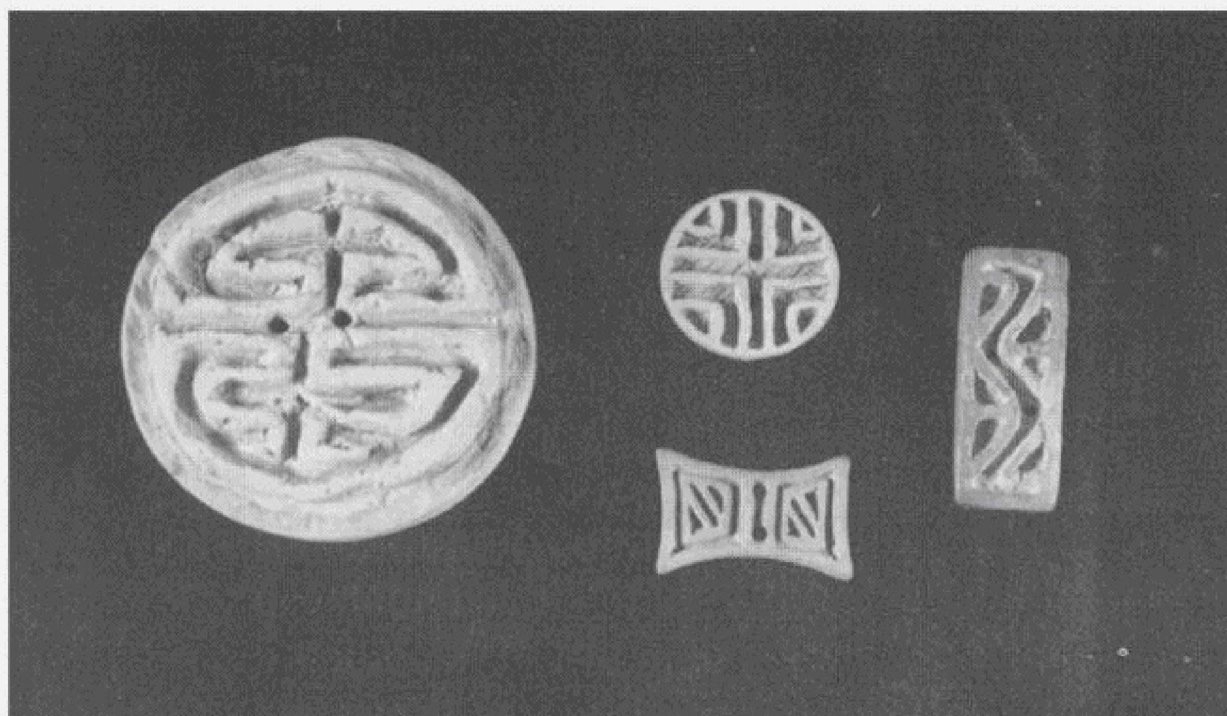
parts of the site were re-used during the late little site of Sur Jungle. tant dimensions are: (1) ware or fabric (forming
Islamic or British period. A very large platformOf the three occupation house site of the Historic Period was built over technique, color, fineness, etc), (2) vessel form, and

levels, the last equates
(3) decorastion. The Baluchi and Afghan sites com
scattered houses and possibly fields north of

Tandoor the main settlement.pare well on all three dimensions for Quetta Ware:to a late phase of the



Artifacts from the Dasht assemblage
(*after Besenval)*



Geometric button seals from Mehrgarh V
(after Kenoyer)

occupation We now know of a number of Amri-Nal,at Damb wheel thrown buff wares, similar vessel forms with more generally Early Harappan sites, on theclosely related motifs. Most of the central AsianSadaat, Not only"Quettaare Ware"coast of the Arabian Sea and its arms in Gujratwell only in terms ofthe ceramic analogues (India). Balakot is on Somiani Bay and two

painted motifs. Most of the pots with these motifs Page 266 precise but in addition little known sites to the west of Karachi, Orthere
are
from central Asian places are hand made of a rather familiarangi and Pir Mungo, seems to have Amri-Nal assemblages. Both of these sites have nowcoarse fabric and the vessel forms on which the

objects such as model motifs are executed are different from those in theEarly Indus—II!become a part of the urban sprawl of Karachi.
houses and the Zhob Quetta Valley. Moreover the central Asian "Quettamother godessOf the two periods of Balakot, the upper one
to belongs to the Indus civilization whereas the

After this period there was

a
conf irm th i s

rapid correlation.whereindepopulation or at least a decrease in the of occupation of the valley, which does notnearby site of

lower one or Period I constitutes a mixed culture NalThe elements are dominant. theWheel made painted pottery, generally related Ranato Nal polychrome style, right from the beginGhundai provided ning of occupation, has been found. Humped

return to a size comparable to its Early

bull figurines, microlithic tools, beads of lapis ample evidence that its lazuli, stone, shell and paste, a limited amount

Painted pottery of Dasht tradition from Registan sequence is directlyof copper and miscellaneous terracotta, shellIndus levels until Islamic times. Theparallel to that of Sur and boneobjects complete the other culturalBaluchistan Jungle. details. Cattle, sheep, goat, buffalo, pig, hare

Val

developments in the Early Indus times inand deer of several varieties have been

identiArtifacts: the Quetta valley have striking parallels inGenerally, compartmented stamps seals, animal figurines, chipped

ley as Ghazi Shah and Amri, and in Baluchistan in fied but not much use was made of the available the upper layers of the mound of Sohr Damb and and ground stone objects, clay sling balls, copper, and of course, the pottery havemarine sources of food. The grain included six

take up the case of western and northern broad row barley, vetch, legume and *ber*. The calibrated Nal. It is the later levels of Kulli affinity that the Kandhar region. The process which is

ness of the area in a separate chapter, we shall not date-bracket is between the late fifth millennium duce unfamiliar elements. The upper phase ofDabar Kot in Loralai, and at Periano Ghundai near Fort Sandeman in the Zhob

here pass the opportunity to look into this pottery outlined in both areas begins with what
Niai Buthi has been dat ed by radiocarbon in the and early third millennium BC.district to the east. style in its general characteristics as they character*Nal Pottery:* The shape of Nal pottery late third millennium.ize chronological time period in the Quetta Valley.impermanent is distinctive: narrow- mouthed, ovoid form withModel houses, clay rattles, stamp seals, copper, alabaster cups, and a repertoire

Quetta Ware was first defined by Stuart a disc-base; narrow-mouthed carinated form within the Kanrach Valley. It was discovered in 1997of pottery vessels which, though it includes much of the earlier Quetta Ware Piggott (34). His description was substantially exa disc-base; almost straight-walled jars with a

and trial trenched in 1998. The nucleus of the setdisc-base; disc-based open bowl; a carinated tlement consists of houses grouped along lanes life which, after successive stage s of more

tion of Damb Saadat (22) as well as by Jean-MariePage 262 and streets. This central portion is about 6 ha form with an inward-turning upper body; and a

Casal's permanent and increasingly elaborate and flat-bottomed canister with a r o u n d a n d

cover altogether ca. 35 ha. The eastern edge is The most highly straight-edge mouth. With the use of red, blue or

eroded by the Kanrach River. Two dams were yellow pigment, the painted surface

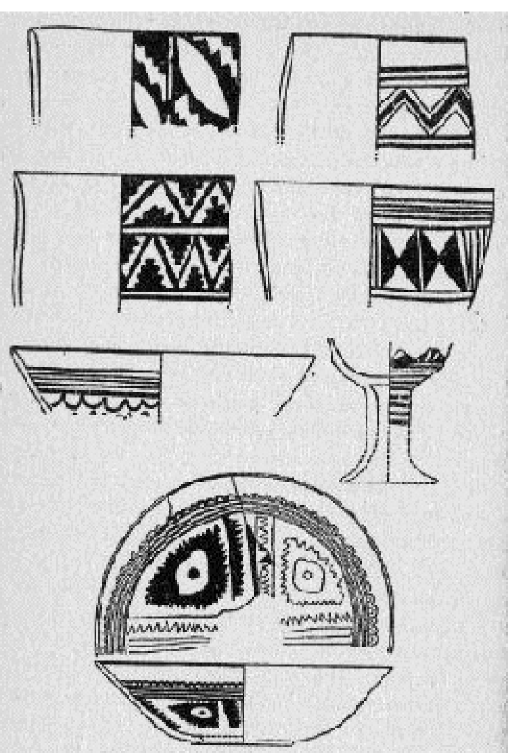
is polychrome sophisticated evolvement, is climaxed by a

developed Quetta Ware is found in Damb Saadat IIand shows repetition of motifs by multiplying their found to the north of the site and we assume that

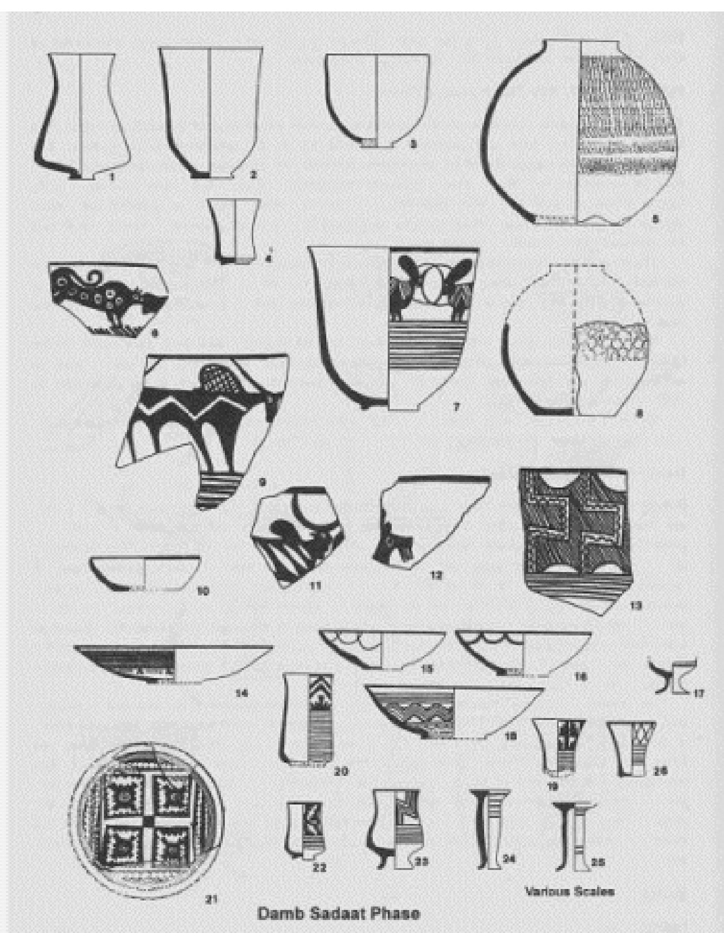
stage where identical and III, reaching a peak in the upper levels of Dambemphasis uponoutlinees in many cases. Naturalistic representa fields were located there. The site and the whole Saadat III. tions of fish and ibex occur as a motif as well. Nal relatively large populations settled around pottery has been bracketed in DS I and DS II inof a terrace hill at the southern edge of the site.One of the most common motifs on Quetta Ware is the stepped square, which was first noticedThe soundings revealed two main periods presumably public the Quetta valley and Period IV of the Anjira-Siah of occupation, the lower with three very compact monumerntal on Nal Ware (described below). The Quetta ver Damb sequence.

building phases, the upper one with two. Thesions are more regular than those of Nal and occur Nal ceramics are among the best made

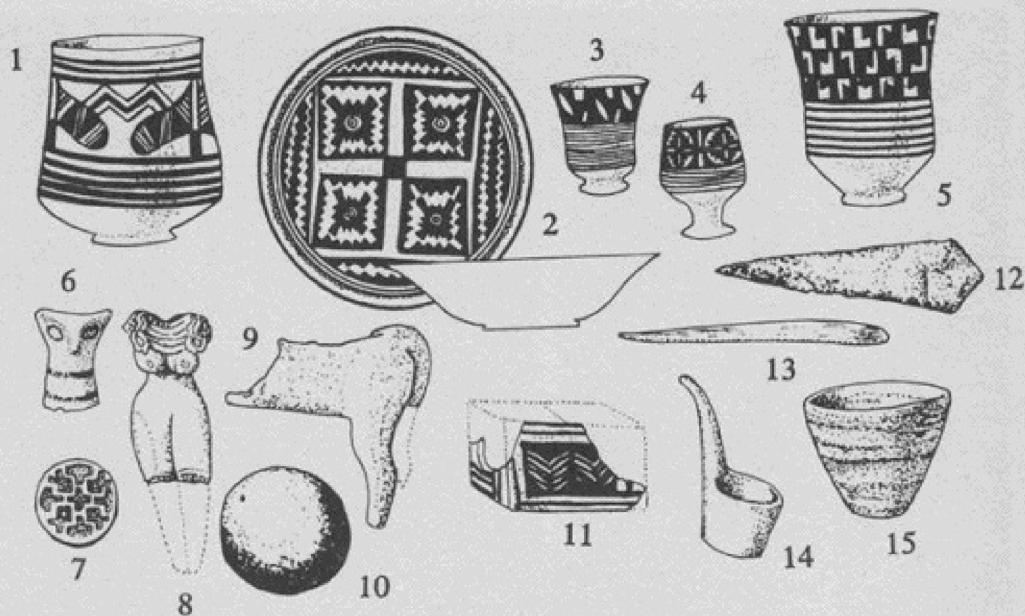
ground was terraced with gravel and pottery be(after in a large number of variations, including concentric and most attractive wares of prehistoric times inTypical *Quetta Ware*Typical Quetta Ware from the Quetta Valley (Piggott)) renderings. Other designs occur as well: squares, *after Piggott*



Typical Quetta Ware
(*after Piggott*)



Ceramics of Damb Sadaat Phase in the Quetta Valley (*after Fairservis*)



Characteristic artifacts at Dam Sadaat II, Quetta Valley (*after Fairservis*)

buildings are manifest. It is in these later stages that we are confronted with new elements in

Ware" makes use of polychrome painting, unlike the black on buff ware in the Quetta Valley.

The correspondence between designs in the two regions is, nevertheless, striking and accounts for something since it is not the only important comparable body of material (25). The figurines and compartmented stamps seals from Baluchistan and central Asia are also alike.

The Origins of Quetta Ware: It has long been recognized that the Quetta valley sites share important and broad parallels in ceramics and some small finds, especially figurines, with a large area in northern Baluchistan, southeastern Afghanistan, Turkmrenia, Uzbekistan and Bactria, as well as in parts of Iran, especially at Shar-e-Sokhta. These interconnections had historically deep roots, which become apparent with the appearance of the black painted ware at Damb Saadat II and III, Mundigak III, and Mehrgarh VI-VII.

type of pottery, which consists of black-on-buff wares, has not been present in the earlier times.



Quetta ware from Quetta Valley
(after Possehl)

Some other examples of *Quetta Ware* from the Quetta Valley (*after Possehl*)

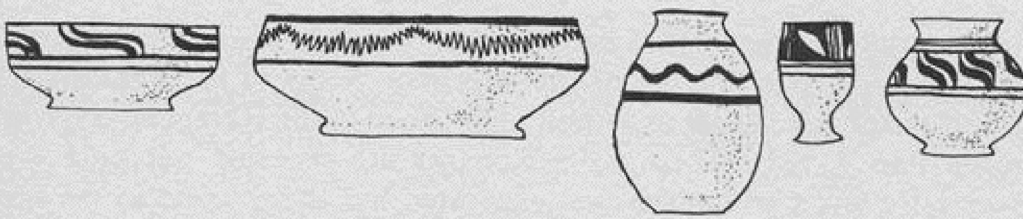
At least twenty sites represent this phase in the Quetta Valley, and they scattered throughout the valley wherever soil and water resources are combined to produce a good basis for agriculture. This phase, like the Early Indus phase in Sites in modern Siestan, in southwest

Afghanistan or beyond, provide further information. The most famous Bronze Age site in Iranian Sierstan is that of Shahr-e-Sokhta (Dry Town), excavated by Italian archaeologists in late 1960s and 1970sa.

The huge site, which was occupied

Pottery from Damb Sadaat III, Quetta Valley (*after Fairservis*)

throughout the third millennium BC, is marked by large amounts of worked and non-worked stone and general, show the growth of villages to maximum size. For example, the site of

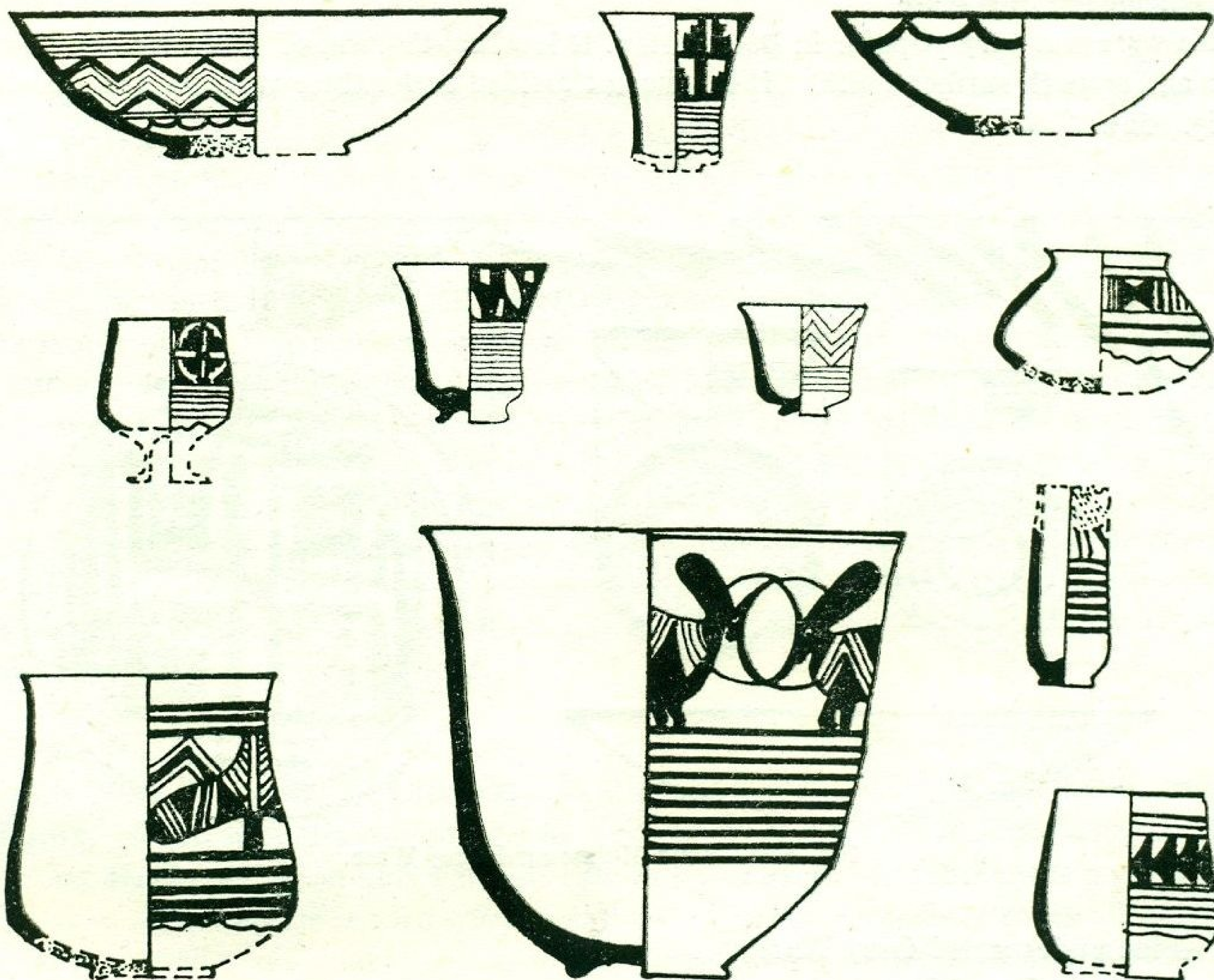

Pottery of Damb Sadaat III, Quetta Valley (after Fairservis)

semi-precious stone: alabaster, carnelian, chalcedony, lapis, steatite and turquoise.by one hundred yards. At the heart of Quetta city stands the Miri, a landmark in the midst of the plain. Its surface is strewn with the Quetta Ware, suggesting that

The archaeologists distinguished four main a good part of the site was occupied during the Damb Sadaat period. periods of occupation, of which the earliest, Period I

(dated to between ca. 3200 and 2800 BC), was roughly contemporary with Mundigak III in Afghanistan and the Quetta Valley culture in Pakistan. The designs on some of the pottery are reminiscent of the pottery from Namazga III (Geoksyur oasis) and the Quetta ware from Mundigak and the Quetta Valley. Shahr-e-Sokhta has also yielded evidence for the pfrresence of the tombs of Namazga. The tombs were mostly used for multiple burials and are either circular or square in shape. Of further interest was the find of a catacomb grave. This type of grave is well known in central Asia, but whether or not thee s a direct link rfemains a moot ;point. In view of the other information discussed above, hoever, a northern origin is very well possible.

There is a small body of literature on the origins of the Quetta Ware: Tosi (37), Masson (38), Biscione (39), Jarrige (40), Gupta (41) and Dani (42) have discussed this question in detail. Vogalsang Willen (43) and Possehl offer two good summaries (25). Masson and Sarianidi note that the formal comparisons of the Quetta Ware from Central Asia and Baluchistan are very close, sometimes identical, particularly for the painted motifs.These analogies are not limited to painted pottery, but are also found in the small anthropomorphic figurines, certain metal artifacts, stamp seals and finally in similar types of burials. In addition we find collective burials in rectangular chambers, similar to those found in Geoksyur II, Altyn-depe and Ulug-depe. It is worth noting that collective burials in *tholi* in southern Turkmenia date back to the fourth-third millennia BC, which means that they carry much older traditions than their equivalent in southern Afghanistan. In other words, there are clear-cut analogies in such conservative and lasting traditions as funeral rites, which can hardly be dismissed as accidental.



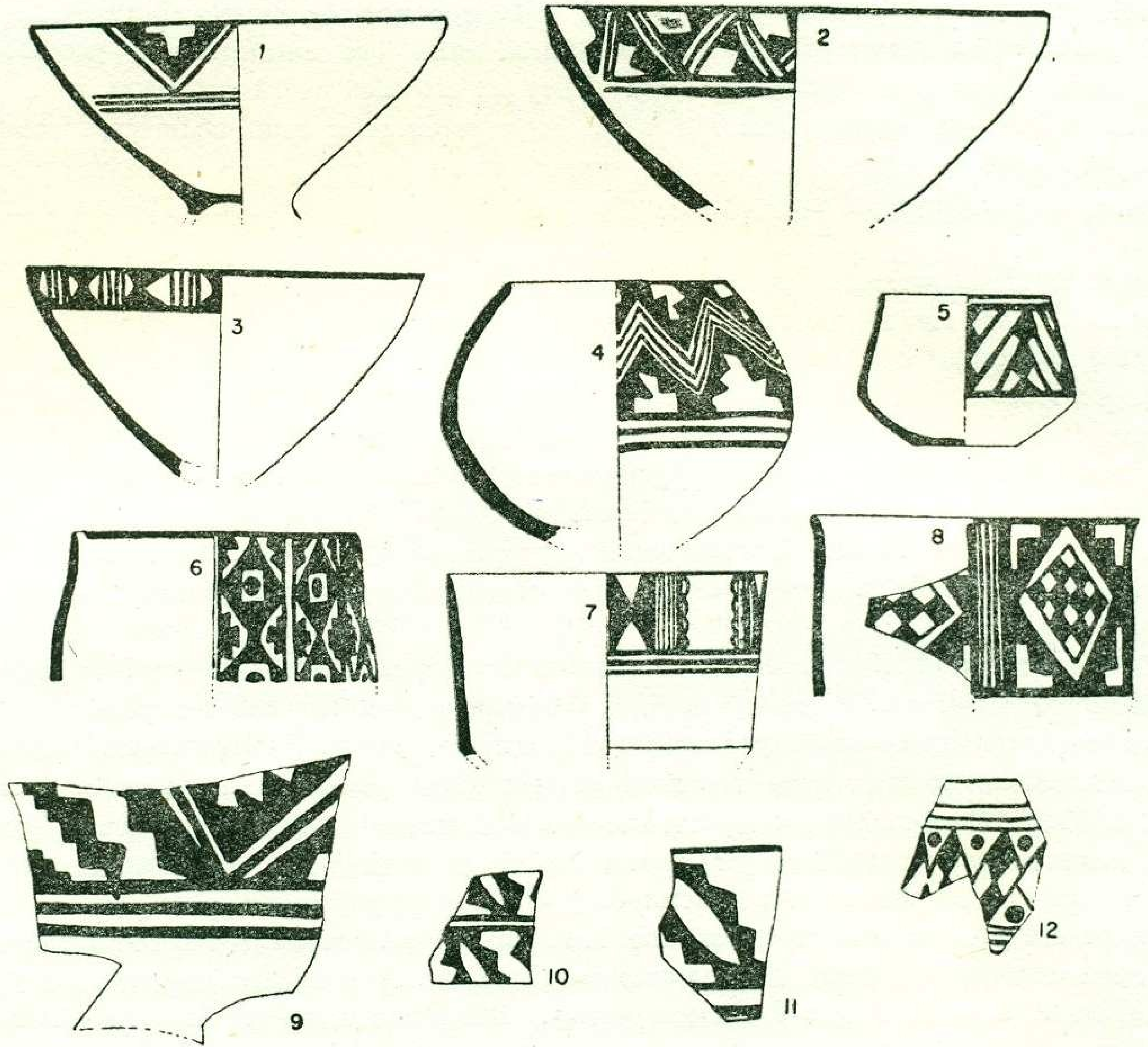
Some additional specimens of Quetta Ware

Sarianidi suggests that the main stimulus passed from north to south. He postulates that newcomers from the west settled in the hitherto virgin lands along the lower course of the Tajand river (in Turkmernia) and developed their own distinctive type of pottery. When the river shifted its course and the lands no longer be properly irrigated, they moved on, towards the South via the Herat corridor (see the next chapter), onto the Iranian Plateau and the Quetta valley.

Raffaele Biscione has stated his position in the following way: "..Soviet scholars, chiefly Professor Masson, Dr. Sarianidi and Dr. Hlopin, succeeded in showing the continuity of the pottery tradition throughout the Chalcolithic period . They have clearly demonstrated that the Quetta Ware was the

422 logical continuation of ceramic styles of periods Namazga I and II, Early and Middle Chalcolithic. We must therefore conclude that the birthplace of Quetta Ware was Southern Turkmenia, and that its spreading over so wide an area was a later phenomenon" (39).

Willen draws our attention to the intrusive



to assume that this feature is limited to the historical period.

There is, thus, a general agreement among prominent archaeologists that this pottery had its origins in Central Asia and it is a rare treat to differ with the impeccable authority represented by these established scholars concerning this point. Possehl, however, strike a cautionary note and generally supports the opinion of Jarrige that suggests that contacts between Turkmenistan and the south went both ways and that the available evidence would suggest the presence of extensive networks of contacts throughout this region. According to Possehl, the question cannot be resolved on available data, although it does appear that the important "stepped cross" motif is Central Asian in origin. Posshel critiques the position of Masson and Sarianidi by statEarly Indus—II!ing that “since there is no information on prehistoric

monumental buildings
located on the highest part

of a site. The one structure
which is particularly known
was discovered in the
uppermost levels of the site
of Damb Sadaat. The houses

Mehrgarh IV: Quetta Ware influence on pottery of mud brick, the string
marked vessels, and lunate
character of the Quetta ware and associated tradiincised bowls, typical of the

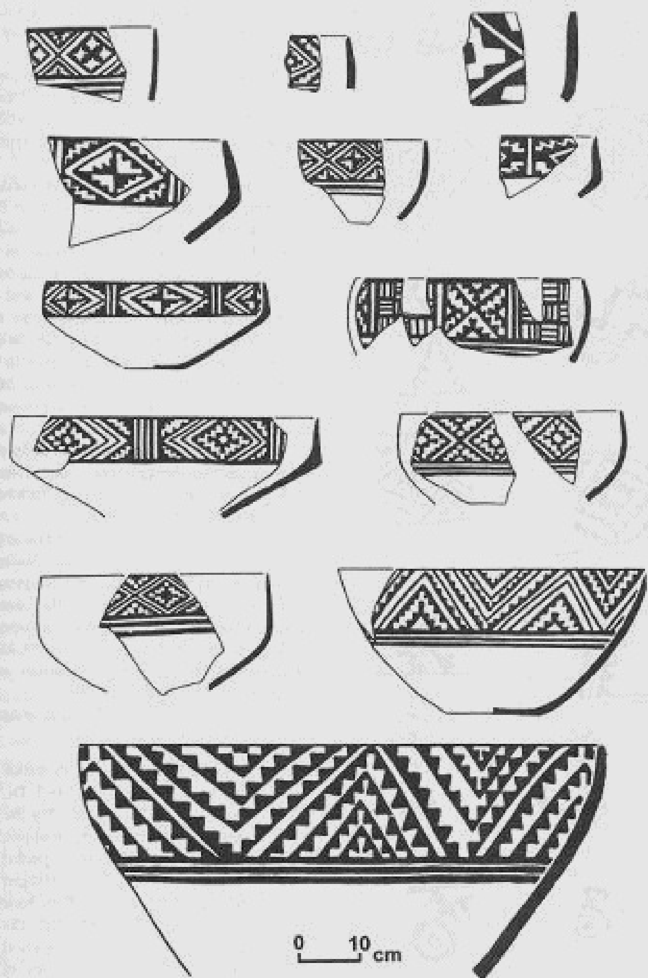
tions in south Afghanistan and the Quetta Valley. It Harappan civilization, in is therefore likely that the Quetta Ware has its ori
gins among northern traditions. It is, unlikely, howZhob and Loralai valleys
ever, that its distribution to the south was merely suggests the Zhob cult's

caused by the shifting of a river course. Something contemporaneity with at more substantial may have occurred in the fourth
millennium BC, as for example, population pressureleast one phase of that urban
from the steppes of central asia, which would be theculture.
first recorded instance of a feature that dominates One the whole history of the eastern part of the Iranian**Long Distance Trade:**

Plateau. of the distinguishing
Whatever the case, it may be assumed thatthe the carriers of the Quetta ware culture brought withaccomplishments of

them more than an idea of how to make striking Damb Sadaat Phase was the
looking pottery. They probably also introduced agrowth in connections
particular type of female figurines and perhaps aand distinctive funerary custom. Since these aspects between Pakistan

were apparently so widely and easily adopted byCentral Asia. The
local craftsmen at Mundigak and in the Quetta valBaluchistan-Central Asia
ley, the same people from the far north probably interaction sphere emerges
also introduced other, and hitherto unknown, cul



Ceramics resembling Quetta Ware from Altyn Depe in Central Asia

(after Masson)

Ceramics resembling Quetta Ware from Allyn Deep in Centro Asia (after Masson)
tural characteristics. If later historical developments in the archaeological record are anything to go by, the people from the Tajan andas one

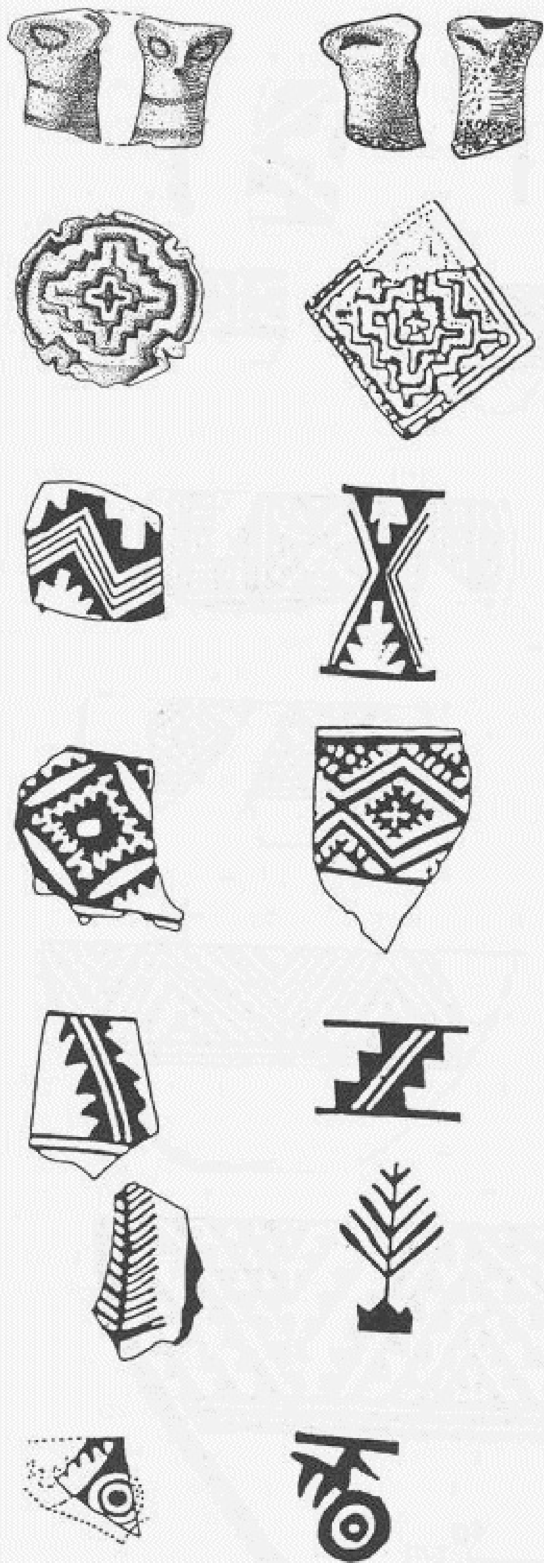
neighboring regions also became class among the autochthonous population of Mungoods, mostly stone and metal. With the exception of turquoise there are few digak and the Quetta valley. All this is impossible to
this data set places Masson's and Sarianidi's argudurable goods from Central Asia that might have been desired by the inhabitants ment in serious jeopardy because it is not known
prove, but pressure from the north upon the oasis of Central Baluchistan. For its part, Baluchistan might have supplied copper and settlements of the Iranian Plateau is a constant fea
whether the burials in Baluchistan would support, or deny their position". Furthermore, he opines that for
Afghan tin. Apart from the archaeological record of durable goods, one must
ture in the history of the area, and thee s no treason the larger body of ceramics, there is as much reakeep in mind that probably most of the trade and exchange must be happening in
perishable goods, such as cotton textile, woolens, felts, leather and pelts. **Origins of Quetta Ware:** There is unanimous agreement among international scholars and archaeologists that Quetta Ware had

its origin in Central Asia and it
is a rare treat to differ with the impeccable authority represented by these

based on durable burials in the Quetta Valley or Central Baluchistan, the dominant hanging the principal element of their position on son to propose that the ware (or wares) originated in Central Baluchistan as there is no support for Masson-Saianidi hypothesis.

As far as Biscione's remarks are concerned, Possehl agrees that his observations are correct Early Indus—II**!**and the Soviet's study of their ceramics do indicate continuity in vessel form, decoration and ceramic

however,
19th
Quettta



Pottery motifs, figurines and compatmented stamp seal from Quella Velley (A) and Central Asia (B) (after Possehl)

Pottery motif, figurines and compartmented stamp seal from Quetta Vally and Central Asia (after Possehl)

plicit "donor-receptor" relationship between Central Baluchistan and Central Asia and that diffusion from one region or the other must have been the mechanism for the transfer of Quetta Ware, the figurines and the rest. Possehl, however, proposes an alternative model, which satisfies the evidence for the general development of thew Quetta Ware; that is to rid the assumption of the donor-receptor

relationship and restate it in terms of mutual interaction, as in an interaction sphere proposed by Joseph Caldwell many years ago. The peoples of Central Baluchistan, Central Asia and the intervening areas as well, established an enduring relationship, probably a series of them, and part of this involved the manufacture of ceramics, figurines and seals, which developed side by side in the area encompassed by the interaction sphere.

The mechanisms that fueled the interaction were probably based on the physical movement of peoples within the sphere: a shared set of activities, with some peoples from all or most of the settlements participating. The movement itself was based in part on ecology and the diverse activities of pastoral nomads in their own diversity of form, but other motives would have propelled it, too; trade, systems of exchange and gift giving, even the human propensity for travel and adventure should be considered a part of the instrumentality. This set of relationships linking Central Asia to Central Baluchistan, extending down on to the Kachi Plain, reaching Mundigak and Shahr-i Sokhta, also seems to have been based more on peaceful processes than on war and antagonism. The durability of the interaction sphere, and a lack of signs of large scale conflict in the archaeological record suggest this. This is basically the position of Jarringe (40) who also proposed that the evolution of the Quetta Ware was the result of a two-way traffic between the Quetta Valley and Central Asia, probably via Shahr-eSokhta but surely through the Kandhar Valley.

Long Distance Trade: One of the distinguishing accomplishments of the Damb Sadaat Phase was Baluchistan
the growth in connections between and Central Asia. The BaluchistanCentral Asia interaction sphere emerges in the archaeological record as one based on durable goods, mostly stone and metal. With the exception of turquoise there are few durable goods from Central Asia that might have been desired by the inhabitechnology. But the same is true for the ceramics of the Quetta Valley, based on Walter Fairservis' original study and Possehl own work with this body of material. It can be concluded, to paraphrase Biscione, that Quetta Ware was the logical outgrowth of ceramic development from Kili Gul Mohammad to Damb Sadaat II. Possehl argues that since there is sound internal evidence for the development of the Quetta Ware in *both* regions, (the burial data being moot), “the problem may have been incorrectly formulated or misunderstood” (25).

Throughout this discussion, there is an imassumption that there must have been a

tants of Central Baluchistan. For its part, Baluchistan might have supplied copper and Afghan tin. Apart from the archaeological record of durable goods, one must keep in mind that probably most of the trade and exchange must be happening in perishable goods, such as cotton textile, woolens, felts, leather and pelts.

THE AMRI-NAL PHASE

The Amri ‘culture’ was first defined by Majumdar at the type site of Amri following his excavations there in 1929-1930. However, the definitive excavation at this site was conducted by JeanMarie Casal between 1959 and 1962. Exploration by Sir Aurel Stein and Beatrice de Cardi in southern Baluchistan has shown that assemblages sharing some features of Period I at Amri are also found in the mountains. The Nal ‘culture’ was recognized by the type of pottery at the site of Nal. Although the Nal material is found both in southern Baluchistan and Sindh, it is perhaps more at home in the highlands

than the riverine plains. This Phase has obvious diversity as exemplified by Balakot and Anjira that have enough Amri-Nal pottery along with similar figurines, beads and the rest but quite diverse in some details. After the consideration of the assemblages from both regions, Fairservis and Possehl combined them into a single regional Phase. Until recently, so little had been known of the archaeology of southern Baluchistan and so little has been so far published that the scheme offered here has to be considered a somewhat primitive device.

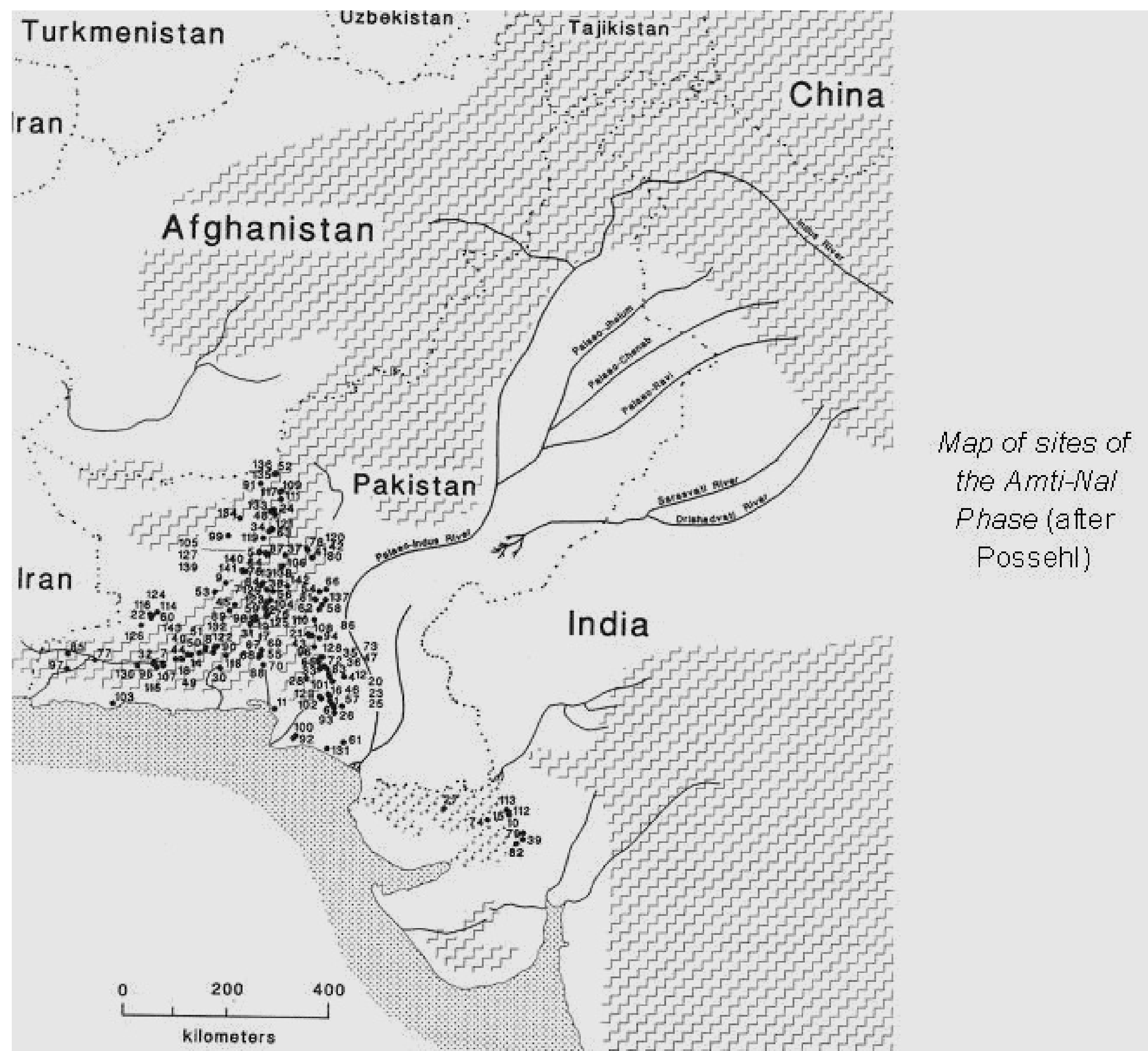
About 150 Amri-Nal sites have been identified, most of them being in southern Baluchistan and southern Sindh but some also in central Baluchistan (25). Amri, Nal, Balakot, Ghazi Shah, Anjira, Niai Bhuti, Siah Damb, Togau, and Kalat may be mentioned as examples of Amri-Nal sites. Generally speaking, in Sindh the Amri side tends to predominate and that in Baluchistan the assemblage is more Nal-like. The pottery of Amri-Na phase is also found in Kulli region (see the next chapter). The chronology for the Amri-Nal Phase is generally congruent with the dates for the other Phases of the Early Harappan Stage, namely 3200-2600 BC.

The Amri ceramic assemblage is made up of extremely well made fine ware, generally fired light red or buff. Red and buff slips are also found, often with black paint. At the beginning of the Phase the designs are exclusively geometric, developing into more curvilinear motifs toward the end. A mark for Amri ware is the open bowls and jars and tall vases with simple, even featureless rims. A selection of Amri pottery in these pages should give the reader a fleeting flavor of this art.

The basic character of Amri pottery – a handmade red/beige pottery with geometrical designs painted with thick brush in black, often with red fillings – remains the same throughout the occupation, although with an increasing proportion of wheel made specimens. Potter’s graffiti or potters’

425 marks, are common. The general artifact assemblage does not extend beyond a little copper, shell and terracotta bangles, sling stones and parallel- sided blades.

Nal ceramics are among the best made and most attractive wares of prehistoric times in South Asia. They too are fine wares and tend to have been fired buff to pink. The slips have a tendency to be very light, buff or weak red, giving a tint to the surface, rather than a dense overall color. The characteristic vessel forms are a canister and straightsided bowl, with a simple, knife-edge rim. These were painted with black geometric designs or with realistically rendered animals: antelopes, goats, fish, scorpions, and birds. Polychrome infilling of these designs includes the use of red, pink, blue and yellow. Painting in white over blackslip is also known, and one of the features shared with Amri. In fact, the use of white paint is a hallmark in the entire Early Harppan Stage of development in all its Phases.



features of Period I at Amri are also found in the mountains. The Nal 'culture'

Map of Amri and Nal sites (*Possehl*)

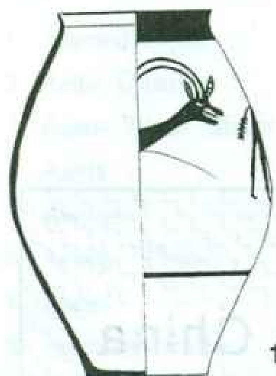
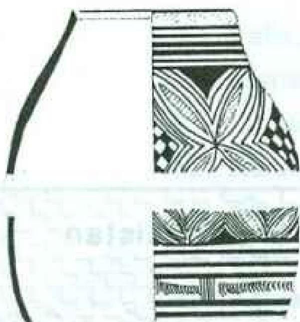
was recognized by the type of pottery at the site of Nal. Although the Nal material is found both in southern Baluchistan and Sind, it is perhaps more at home in the highlands than the reverine plains. After the consideration of the

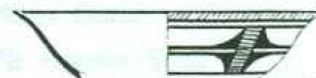
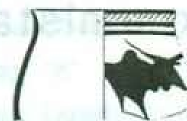
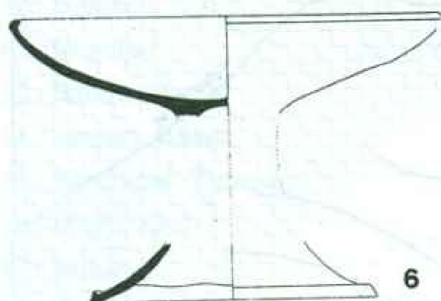
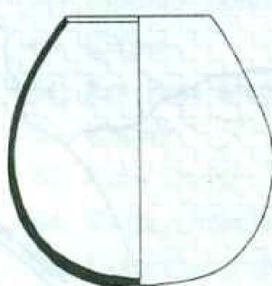
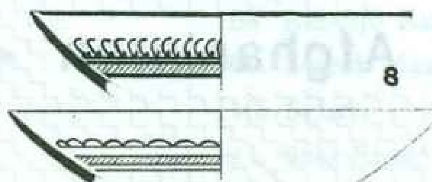
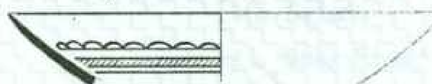
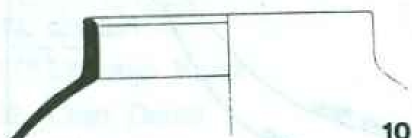
The Nal potter developed a canon for paint

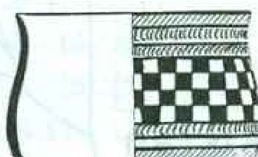
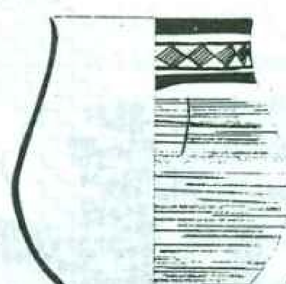
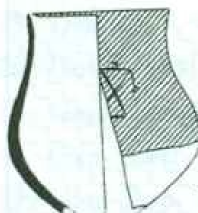
assemblages from both regions, Fairservis and Possehl combined them into a sin gle regional Phase.ing that often took a basic geometric design and repeated it in a concentric pattern. These were freThis Phase has obvious diversity as exemplified by Balakot and Anjira that have

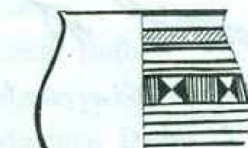
quently arranged as a series of panels around the
enough Amri-Nal pottery along with similar figurines, beads and the rest but
body of the vessel. There is precision to the compo
quite diverse in some details. So little has been known of the archaeology of
sition and execution of Nal painting that is not paral
southern Baluchistan and so little has been so far published that the scheme
leled in other ceramics from prehistoric Pakistan.
offered here has to be considered a somewhat primitive device. About 150 Amri

The fine quality of the fabric combined with the
Nal sites have been identified, most of them being in southern Baluchistan and
sense of composition and the use of polychrome
southern Sind but some also in central Baluchistan. Amri, Nal, Balakot, Ghazi
decoration all come together to make very attractive

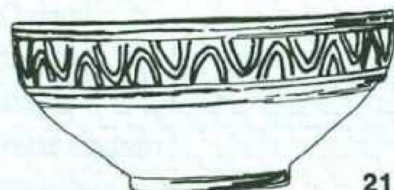



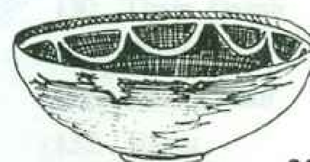








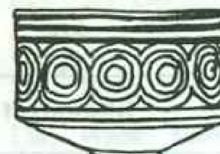












0 10 cm

Pottery of the Amri-Nal Phase (after Possehl)
Among the material culture remains of the Amri Culture, the pottery is very distinctive. It consists of geometrical designs, while the unpainted vessels often show a dark red-slipped surface. Also the flint
Early Indus—II**!**
little pots (25).
Amri Sites: The western fringe of the Indus

Shah, Anjira, Niai Bhuti, Siah Damb,

plain, Kirthar piedmont and Kohistan is a distinct geographical area, with Kirthar rampart paralleled

Togau, and Kalat may be mentioned as

on the east by the Lakhi range and bordered on the east and southeast by Kohistan where low, parallel

examples of Amri-Nal sites.

ridges define wide open valleys with thermal springs

and rivers. Amri: The western fringe of the Indus

Amri: One of the well-known archaeological

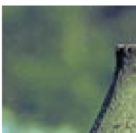
sites of this geographical sector is the site Amri. It is plain, Kirthar piedmont and Kohistan is a

located at the edge of the cultivated alluvium within

distinct geographical area, with Kirthar

2 km of the right bank of the Indus, but most of the

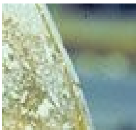
rampart A red-slipped pot from the Tharro Hills on therelated sites are loby paralleled east the

cated around ther

Lakhi range and bordered on the east and

mal springs and take

advantage of the southeast by Kohistan where low, parallel down

water coming

ridges define wide open valleys with

nor water-courses of

thermal springs and rivers. One of the region. Good

the

well-known archaeological sites of this

however, limited, but

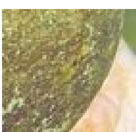
geographical sector is Amri. It is located

large grazing areas

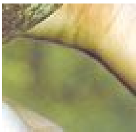
at the edge of the

and
plentiful year

cultivated alluvium

round supply of wa

within 2 km of the right bank of the

for large-scale pas

Indus, but most of the related sites are

toralism.

located around thermal springs and take

A red-slip Amir pot from periods have been

There Hills, Southern Sindh **advantage of the water coming down the**

i n g t o t h e E a r l y

innumerable minor water-courses of the

Harappan period dis

region. Good

cussed here. Period 1A is a rough equivalent of

agricultural soils are,

Mundigak Period II. Small finds include a small

however, limited, but large grazing areas

amount of copper, chert blades, stone sling balls
and a few terracotta beads and bangles. Shell ban

and plentiful year round supply of water

gles are also present, although they are rare. Period

make it suitable forIB has houses of mud bricks of irregular size. Thelarge-scale

rooms are small and rectangular. Bone tools and an

pastoralism.

abundance of chert blades are noted.
Period IC has two types of structures. The

first is a rectangular habitation, with evidence for **The site of Amri is located south of the**

Search for stuff on **Archaeology** **|** **Prehistory** **|** **Ancient India** activities of daily life. Hearths are found associated



Lakhi Hills, just below Lake Manchar.

with these buildings, but never inside them. This tradition still continues on into the modern times in

The site as a whole is at low elevation and

the villages of modern Pakistan where hearth are

Web **subject to flooding from the Indus. It is**

always located in the courtyard, outside the living

rooms. The second type of structures is compartat

the margin of cultivated **located .**

mented, recalling similar structures at Mehrgarh.

Evidence for activity outside of them was found inalluvium, the river being some 1500

the form of ash and refuse; another parallel with

meters away to the east.

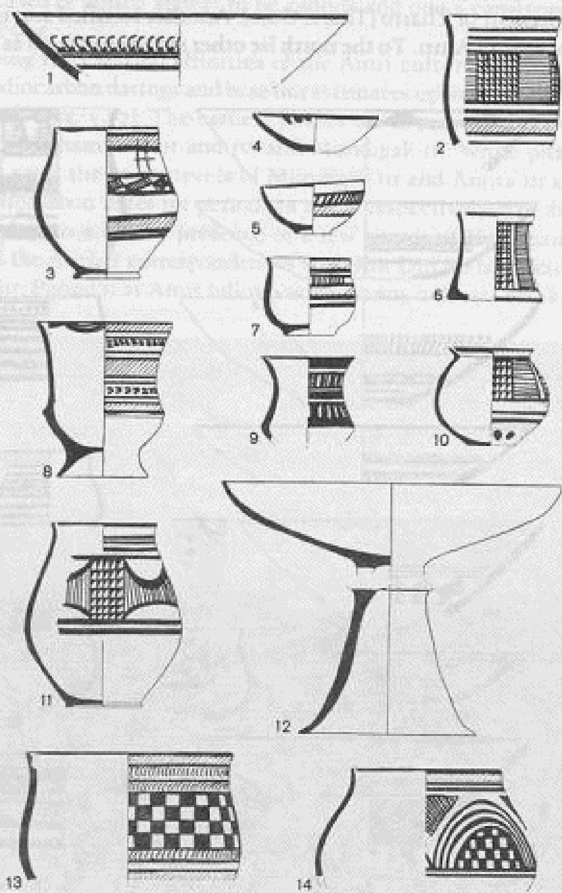
evidence from Mehrgarh. Period ID has continuity with IC. It has compartmented buildings similar to

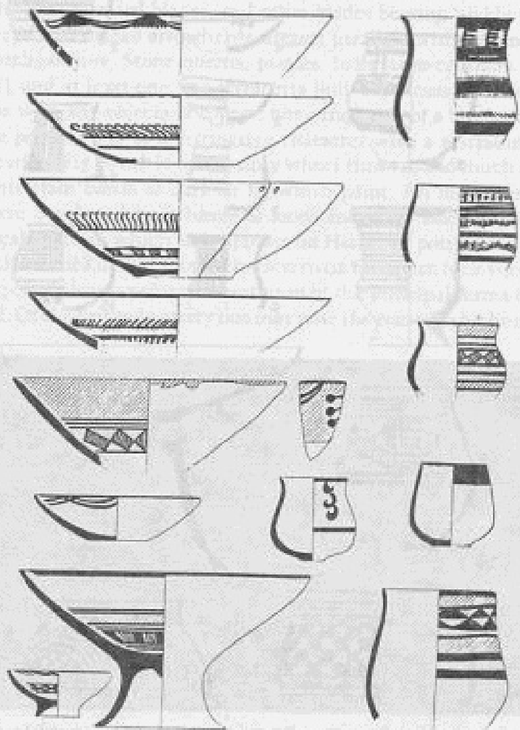
Four occupation periods

those of IC. According to Fairservis, the Amri matehave been

rial appears to derive out of the Nal-Kechi Beg

Quetta tradition.identified corresponding to the Early





Amri painted pottery from Period I

(after Casal)

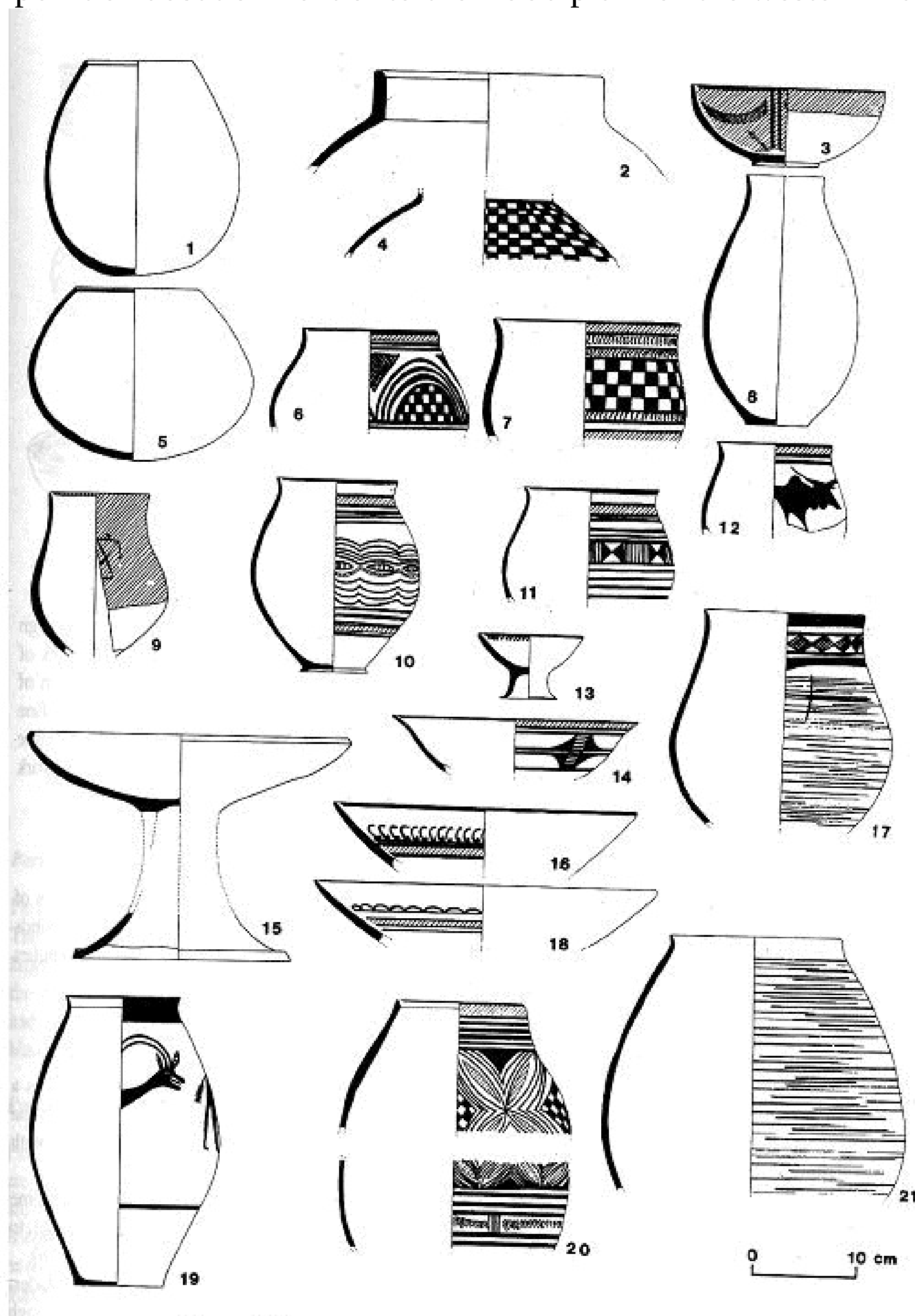
Indus period discussed here. Period 1A is **Pottery of Amri, Period I (*after Casal*)are located close to rivers and streams near their**
a rough equivalent of Mundigak Period II

point of debauchment onto the flood plain of the western Nara and Manchar Lake system. As al

(see the chapter 10). Small finds include a

ready stated, some sites are close to hot springs
427

streams near their point of debauchment onto the flood plain of the western Nara



Typical pottery of Amri-Nal Phase

(after Possehl)

and M anchar Lake system. Some sites are close to hot springs (Ghazi Shah, Damb Buthi). These sites are representative of small villages where inhabitants built house walls of mud brick often set on boulder foundations. Often these villages were located on spurs or hillocks above what had once been cultivated area (Damb Buthi, Naig, Chauro) but majority are found in the low area at the

foot of the hills or spurs (Ghazi Shah, Gorandi, Pandi Wahi). Several sites, in

: Several Amri settlements are located close to rivers and

Representative pottery from Amri Phase

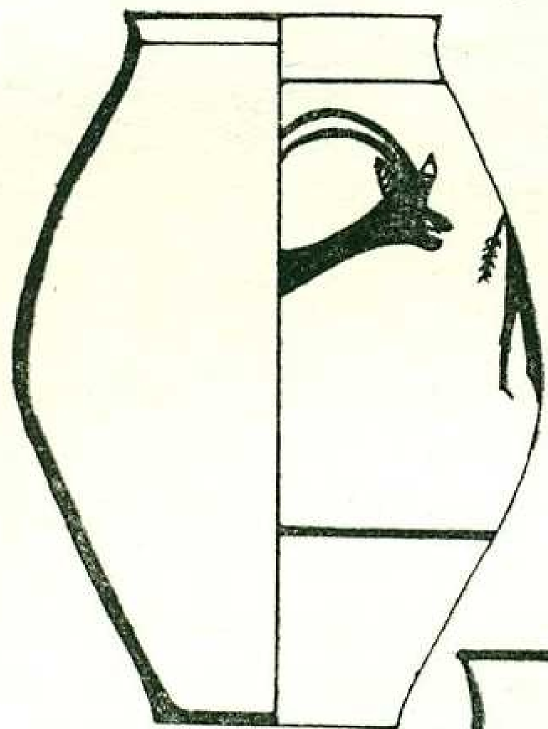
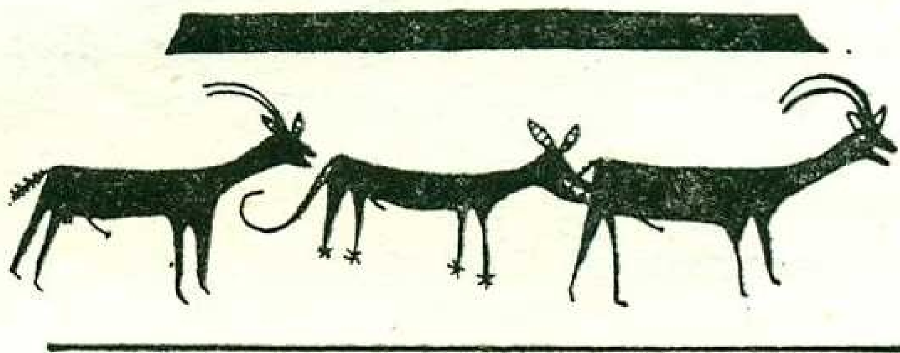
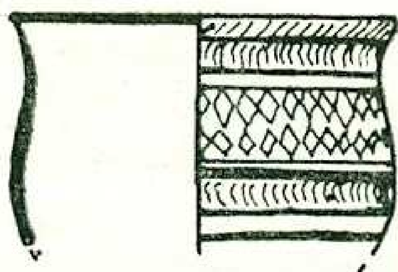
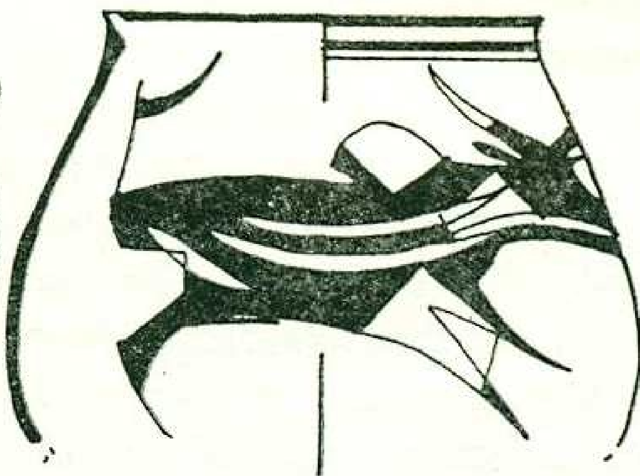
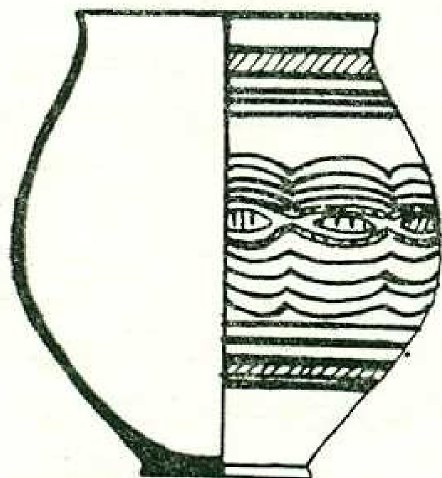
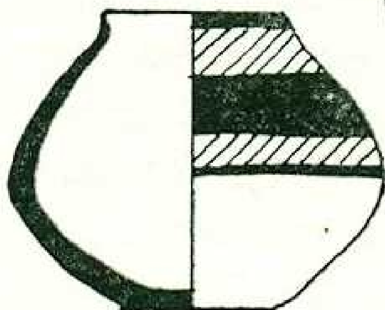
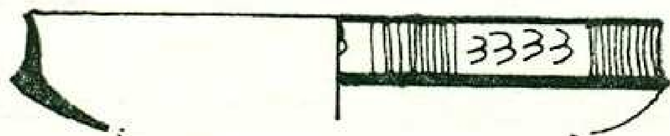
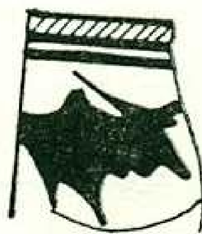
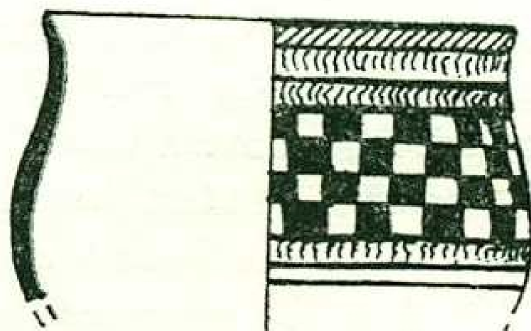
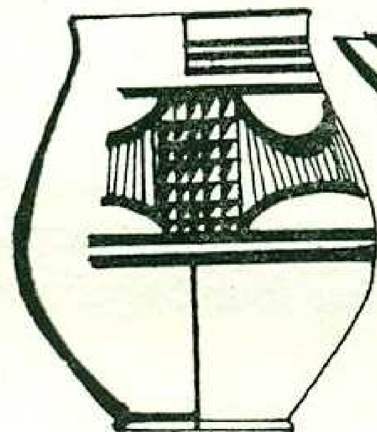
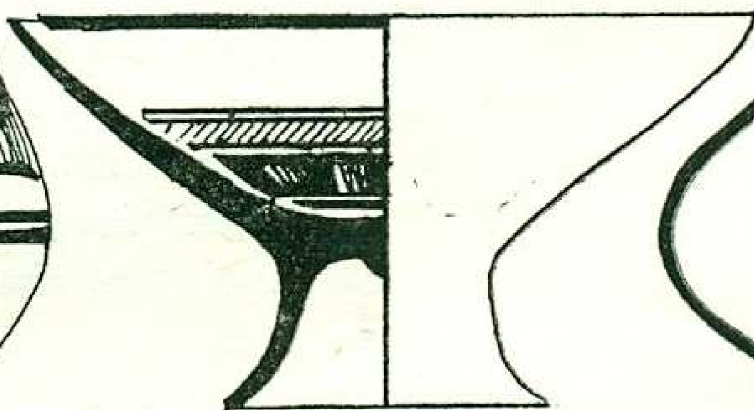
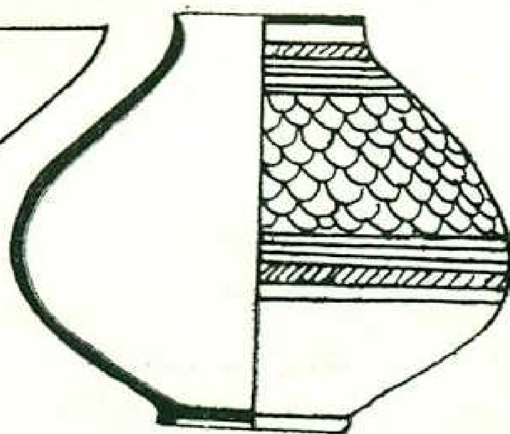
(Ghazi Shah, Damb Buthi). These sites are representative of small villages where inhabitants built house walls of mud brick often set on boulder foundations. Often these villages were located on spurs or hillocks above what had once been cultivated

 area (Damb Buthi, Naig, Chauro) but majority are found in the low area at the foot of the hills or spurs (Ghazi Shah, Gorandi, Pandi Wahi). Several sites, in fact, were located directly on the Lake Manchar plain. The site of Lohri, for example, is inundated annually and for a large part of the year is just above water-level.

Damb Buthi, near the Bandhni River outlet, is located in western Sindh just south of the lake. This region is rich in hot springs. It is an AmriHarappan site but the two cultures are separated on the hill which was the locality of habitation. Majumdar conducted a small excavation there in 1932. In the course of his excavations Majumdar exposed five rooms, outlined by stone foundations. One contained human bones, seemingly incomplete and definitely calcined. Several other burials were found in rectangular enclosures fashioned from roughhewened stones, which Majumdar likens to similar facilities at Nal. No ceramics were found. A good deal of artifactual debris was associated with human remains, including a variety of pottery, flint flakes and cores, terracotta and shell bangles, and a stone bead. Interestingly, a mussel-shell container was uncovered still holding a quantity of red ochre.

The most southerly of the Amri sites is that of Tharro Hill, located close to the Indus delta some eleven miles west of Thatta, the old capital of Sindh. This is a natural hill which rises some thirty feet above the alluvium. It is one of several in the area, on some of which flint flakes and cores and other debris have been recovered. At Tharro Hill the Amri settlement is marked by a line of a stone wall intended to enclose a small settlement within which signs of habitation are numerous (25).

Nal Sites: Nal pottery takes its name from a prominent village, some 40 kilometers west of Khuzdar in Jhalawan. It is located at a communications node and has a point of settlement for many millennia. There is an archaeological site about seven kilometers to the east of the present village. This is Sohr Damb, which is a very prominent feature of the landscape. More importantly, between

Pottery from Amri (after Casal)

Khuzdar and Nal, forming the apex point of a triangle linking these three places, is Sekran where there are extensive traces of old lead and antimony mining. Pre-industrial lead-smelting is also reported from the area (25).

As a site, Nal covered about 5 hectares and was systematically excavated in 1925. The excavated area was designated Area A, where two kinds of structures, one utilizing the boulders of a local river bed and the other using large quarried stones from the neighboring hills, were noticed. Otherwise, the whole area – all of its occupational depth of 1.2 m – was found full of burials which comprised mostly fractional burials in pots but had a few complete graves in defined graves as well. For example, an infant's grave was found in a small chamber made by setting mud-bricks on edge, and the grave goods included 16 beads and a crystal pendant. A complete burial of an adult showed a grave where the body lay east- west, set on the left side, with the legs bent. There was no grave goods here, just as there was no grave goods in another infant burial. Complete burials without defined graves have also been recorded.


Another example of polychrome Nal bowl from southern Baluchistan

The miscellaneous cultural material recovered from the deposit forms an impressive list: copper adze, saw, chisel, knife, seal with a holed lug on the reverse, silver foil, carbonate of lead, lead slag, a celt made of quartzite, limestone weights, balls, grinding stones, marble ring stone and disc, bone disc and worked fragments, cattle figurines, and a large number of beads made of crystal, agate, carnelian, paste and lapis lazuli.

There has been a good deal of digging at Nal and Possehl gives a good account of it (25). It was first excavated in 1903 by Mirza Sher Muhammad, recovering 59 vessels, all of which were turned over to Sir John Marshall who described them in one of his reports. Claud Jacob excavated more pottery at the site while he was commander of the Hazara Pioneers. Some of these finds went to the Quetta Museum which was later destroyed in the disastrous earthquake of 1935. In 1923 the Bizanjo Sardar of the region excavated more pottery. It was broken in transport to Quetta. This led Hargreaves to conduct a systematic excavation in 1925. These diggings produced evidence for fractional burials, some of which were concentrated in association with the beautiful Nal funerary pottery. Three complete burials in brick lined graves were found associated with architecture and other classes of material, pottery, figurines, beads and the like. He also produced a fair number of copper implements.

Southeast of Nal and Khuzdar are numerous sites in the Hab and Karnach valleys, Kolwa, the Wadh, and the area to its north. These sites have several things in common. First, there is little evidence for the early occupation of the type represented in the Quetta Valley and at Anjira I. There is, however, evidence ofr the next period, that is the Kulli culture, mixed with the Nal influence. The wide distribution of the Nal-type settlements includes for the first time at the low-lying alluvial plains of the southern Indus River Valley, or western Sind, and the district of Las Bela. De Cardi has noted Nal pottery well down toward the Mula Pass in the Mula River valley at Jahan. At larger sites of Judeirjodaro near Jasckobabad in southern Kachi, Raikes found ceramic material suggesting Early Harappan occupation there that included a canister of Nal type as well as a number of sherds with painted designs familiar to the southern Baluchistan culture. De Cardi also found similar material at Pathiani Kot at the foot of the Mula Pass.


Yet another example of buff Nal pottery with typical pattern from Niai Buthi, southern Baluchistan

The archaeological area of the Hab Valley has been extensively surveyed by Joint GermanPakistan Commission and excellent reports are now available. During the surveys carried out in 1998 and 1999, 106 sites were discovered. Chronologically and culturally, they belong to the same horizon as the sites in the Kanrach Valley and the Las Bela plain. No real mounds were found, but, in general, the settlements tend to be larger than in the other areas. This is in particular true for the Kulli sites which cluster in large numbers between Dureji and Barag, and at points where tributaries such as the Loi, Bahlol, and Saruna rivers enter the Hab Valley. Nowhere were similarly large, nucleated towns found in such large numbers. These settlements apparently formed a network controlling the access routes between Sindh and interior Baluchistan. Invariably, they are associated with dams, some of which are true masterpieces of construction. The pottery and objects found at these sites are clearly related to the Early Harappan types but the fabric is usually coarser, the variety of shapes and motifs is smaller, and a number of local elements are also present. Early Indus—II!amid are the pottery types which

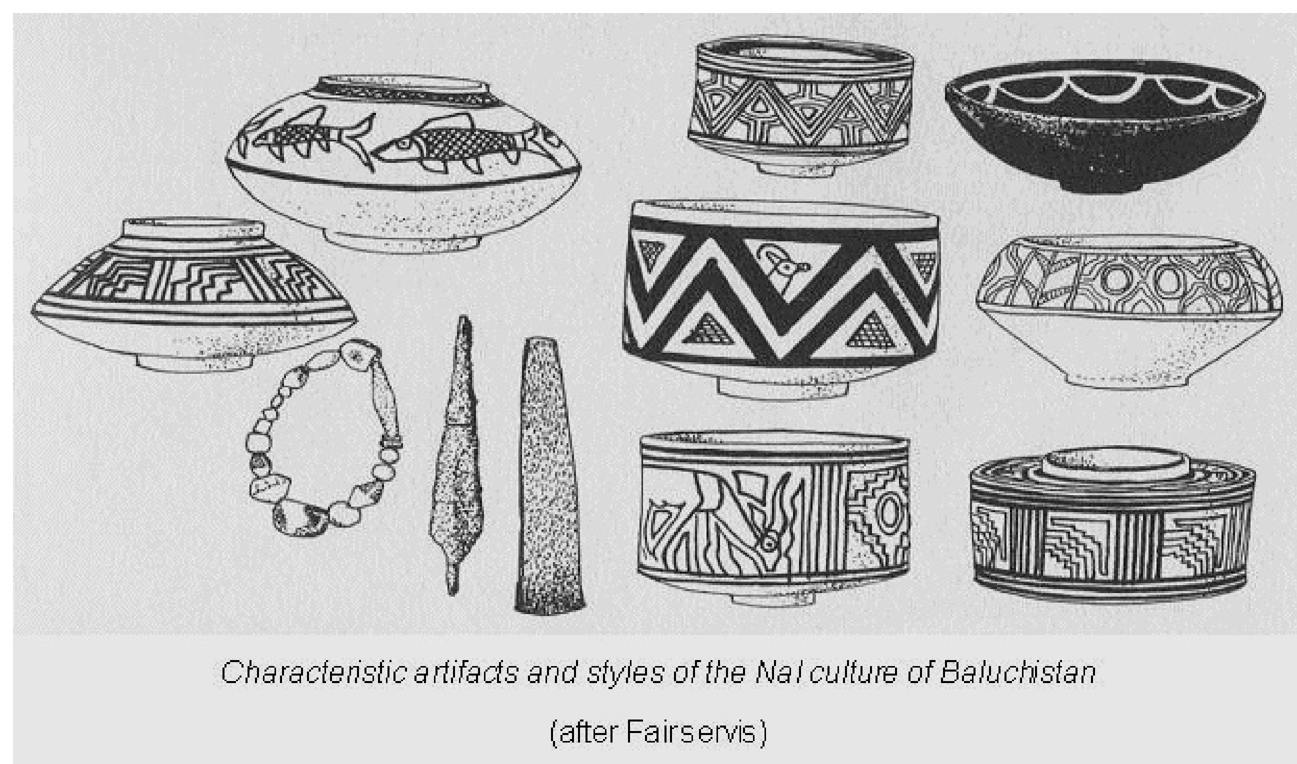
were first identified

Several sherds of Nal type were recovby Stein at the site of Kulli, the largest in Kolwa. The ered on the surface of the site at Niai Buthi. Of conearlier phases of the Niai Buthi I are related to the siderable interest for its tantalizing suggestions of a

ceramic corpus familiar in the last phases of Early

Pioneers. Some of these finds went to the Quetta Museum which was later generic relationship to wares found in both KalatHarappan occupation of such sites in the Indus Val and Quetta are examples of white paint on black destroyed in the disastrous earthquake of 1935. In 1923 the Bizanjo Sardar of the

slip pottery. Indus Valley affinities are clearly expressed in the surface recovery of examples of graters, incised fruit stands, and string-marked pottery, the latter frequently possessing a red slip. Niai Buthi contains, therefore, the familiar Nal ceramics at its earlier levels and, in its topmost, the signs of contact with the Harappan Civilization. Between and



Characteristic artifacts and styles of the Nal culture of Baluchistan

(after Fairservis)

be confirmed as belonging to the cemetery (35). B. de Cardi points out that only rarely does true polychrome Nal pottery occur in the settlements of Surab (36). This pottery at Nal is clearly a funerary ware.

The New Finds

Hargreaves's excavation report of 1929 lists copper and silver objects which he recovered. Those of silver were not described in greater detail than "[No.] 20 silver foil. Eight fragments of brittle and oxidized silver foil. Largest fragment 201 mm in length. One fragment shows small parallel flutings in repousé... A5" (37). The "eight fragments" catalogued belong actually to the three objects of our study. Hargreaves's near omission in the excavation report of the silver objects from locus A5 seems to have been an oversight. Perhaps they were in the process of restoration and for this reason unavailable. The finds have been cleaned and show no clear signs of oxidation to the naked eye.

Characteristic artifacts and styles of the Nal culture (Fig. 1.1*after Fairservis***)**) and in the same material an unusual implement (Fig. 1.2), both which I examined and recorded in 1985, are on permanent exhibition in the National Museum in Delhi. Hargreaves also mentions the silver "unidentified object, No. 20" on p. 33 which is probably the

Early Indus—II**!** "cult object" (quotation marks mine) in our

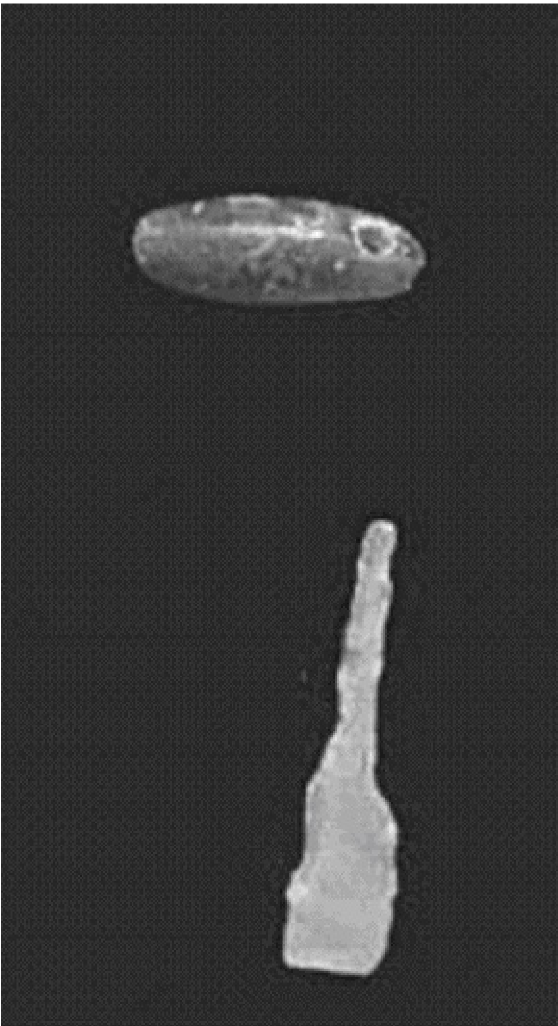
region excavated more pottery. It was broken in transport to Quetta. This led Hab Valley and the Hargreaves to conduct a systematic excavation in 1925. These diggings pr oduced evidence for fractional burials, some of which were concentrated inSoutheast of Nal and association with the beautiful Nal funerary pottery. Three complete burials in brick lined graves were found associated with architecture and other classes of material, pottery, figurines, beads and the like. He also produced a fair

Nal, Copper-based implements (*after Hargreaves*) Fig. 1.2, since the other two objects are readily identifiable. In addition, inquiries in the Museumnumber of copper implements. The yielded a repousé silver harvesting knife or hand sickle (1. A dagger blade; 2. A cult object or a mirror; 3. A harFig. 1.3), which, like the other two objects, is

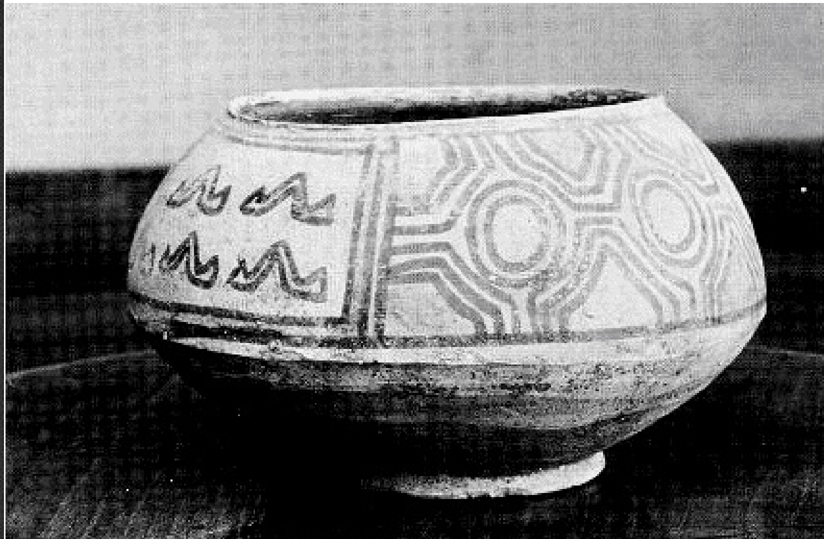
Copper implements from Nal (*after Hargreaves***)** registered in the accessions record (38) **vesting knife**. The source given is the "DGA" (Director General of

site of Sohr Damb near Nal has

Archaeology). The number "26" in the inventory number attests to the accessioning of the three pieces in 1926, doubtless from Hargreaves's excavation, and not those of his predecessors. The three pieces are sequentially numbered and no further silver objects appear to belong to this lot. Confirmation of the find circumstances lies in Hargreaves's description "...one fragment shows small



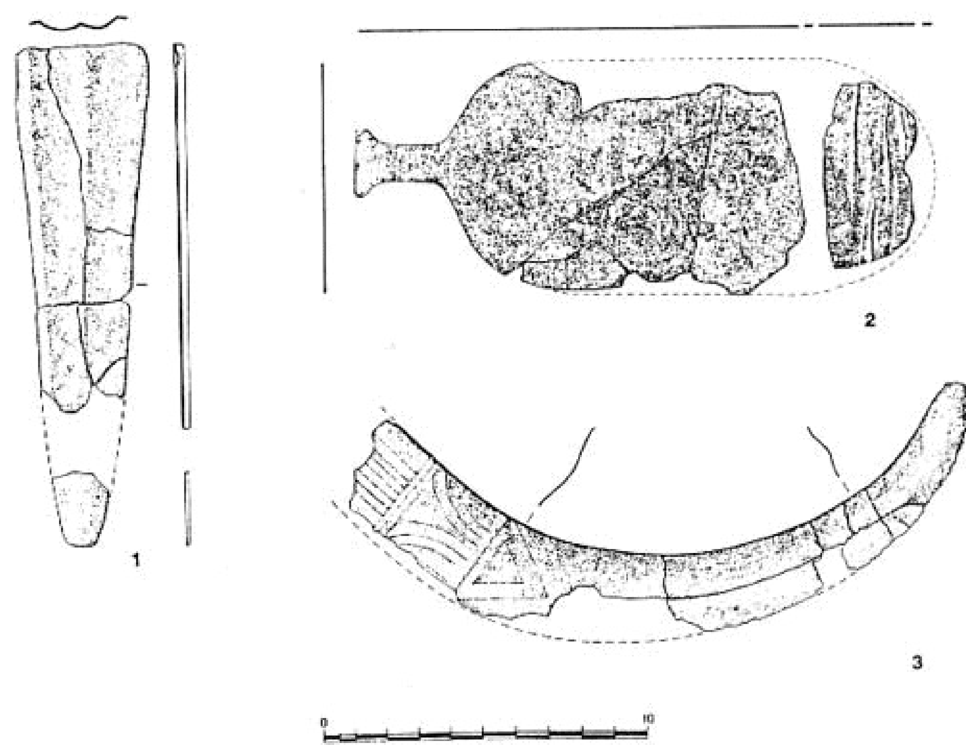
A camelian bead abd a drill, Adam Buthi, Las Bela



Nal pottery with concentric designs

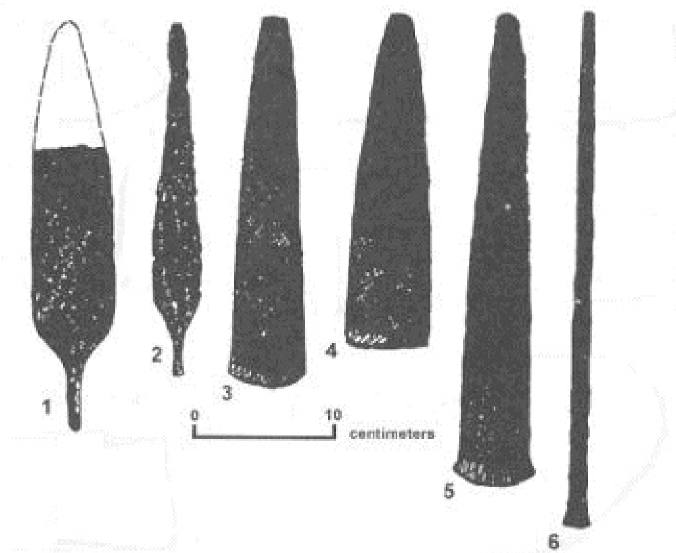
(National Museum, New Delhi)

Khuzdar are numerous sites in the Hab and Karnach valleys, Kolwa, the Wadh., and the area to its north. These sites have several things in common.



First, there is little
evidence for the early

Fig. 1.1 Dagger blade NM 2622.- 1.2 Cult object NM 2620.- 1.3 Harvesting knife NM 2619. Figs.
occupation of the type **1.1-1.3 Sohr Damb**
represented in the Quetta **Silver implements from Sohr Damb (Nal) graves .** Valley and at Anjira I. There is,



Nal, copper based implements

(after Hargreaves)

however, e

been subjected to four campaigns of

vidence for the next period, that is the Kulli

excavation, including one by

wide
culture, mixed with the Nal influence. The

Hargreaves. Animal
distribution of the Nal-type bones, settlements includes for the first time at the
including birds have been found at t

Early Indus—II!
complete the A Prelude to Civilizationcultural details. the upper layers of the mound of Sohr Damb near sheep, goat,
Nal. It is the later levels of Kulli affinity that produce

unfamiliar elements. The upper phase of Niai Buthi has been dated by radiocarbon to the late third millennium.

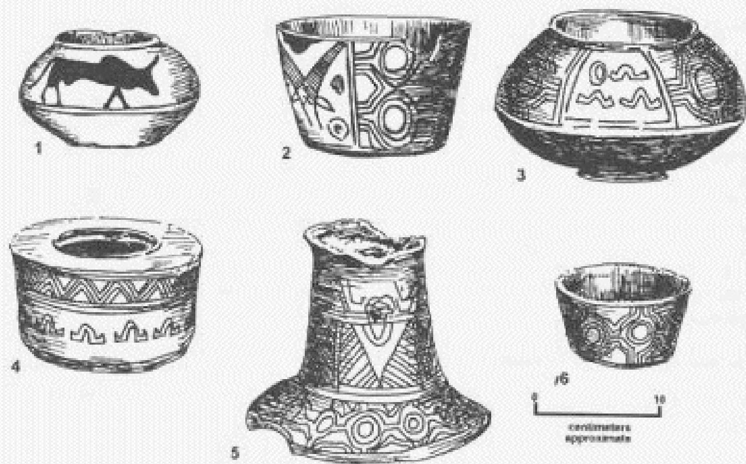
Murda Sang is the largest prehistoric site in the Kanrach Valley. It was discovered in 1997 and of food.
The

trial trenched in 1998. The nucleus of the settlement consists of houses grouped along lanes and streets. This central portion is about 6 ha large, but scatvetch, legumetered occupation and a kiln area cover altogether

. The calibrated
ca. 35 ha. The eastern edge is eroded by the Kanrach River. Two dams were found to the north of the
e a r l y t h i r d

The shape
pottery is
narrow
ovoid form
a disc-base;

form with a



Nal pottery publish by John Marshall



Nal pottery associated with early Kulli levels of southern Baluchistan. These examples are from Edith Shahr Site. (after Fairservis)

almost Early Indus—II!

the vessel. There is a precision to the composition and execution of Nal painting that is not parallel in other ceramics from prehistoric Pakistan or in fact anywhere in the south Asian or central Asian region. The fine decoration all

Nal pottery associated with early Kulli levels of slouth

an inward

come together to make very attractive little pots. Some of these designs, **ern Baluchistan. These examples are from Edith Shahr**

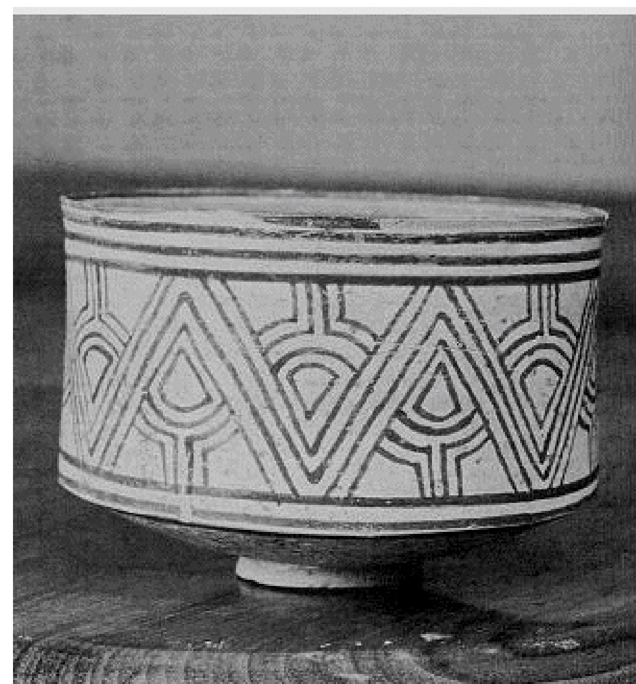
especially the geometric ones, are still used on *Ajrak* textiles in lower Sind. **site (*after Fairservis*)**

a round and

mouth.

With the use of red, blue or yellow pigment, the painted surface is polychrome

and shows repetition of motifs by multiplying their outlines in many cases. Naturalistic representations of fish and ibex occur as a motif as well. Nal pottery has been bracketed in DS I and DS II in the Quetta valley and Period IV of the



Nal pottery with concentric designs (National Musium, New Delhi)



Nal pottery with concentric designs. The canister shape is characteristic of the Nal assemblage. (National Musium, New Delhi)

Nal pottery with concentric designs (*National Museum, New Delhi, India*)

Amri Pottery: Page 281**Two typical bowls, sup[eerily decorated, from Nal**The Amri ceramic assemblage is made up of xtremely well made fine ware, generally fired light red or buff. Red and buff slips are also found, often with black paint. At the beginning of the Phase the designs are exclusively geometric, developing into more curvilinear motifs toward the end. A mark for

site and we assume that fields were located there.

Amri ware is the open bowls and jars and tall vases with simple, even featureless The site and the whole valley are overlooked by a

fortification built on top of a terrace hill at the south**Amri-Nal Subsistence Practices:** Except for Balakot, there are almost no ern edge of the site.remains of plants and animals that have been described from the Amri-Nal sites.

There is a small report on the faunal remains from Amri. It documents a patternThe soundings revealed two main periods that is recurring at other sites, with an abundance of cattle bones and some sheep

of occupation, the lower with three very compact building phases, the upper one with two. and goats. Bones of Sindhi crocodile, rhinoceros, and wild ass have also been The

found. The villages along the piedmont of Baluchistan were placed to take advantage of the hill torrents or *nais*

ground was terraced with gravel and pottery before and the natural springs that dot the outer

construction. Houses have a stone foundation,but face of the mountain front. Lake Manchar, the natural inundation basin of the mud bricks were also used, the roof was coveredIndus, was extensively utilized as an environment to be directly exploited for

marine food and a huge, naturally irrigated farming tract, resulting from the with mud-smeared reed. The pottery from the ear
lier occupation is very similar to that from the earlier levels of Balakot I.Page 283

An AMS date run on charcoal suggests a dating into the very early third millennium BC. After 2700/2600 the site was abandoned. The u p p e rmost, badly preserved occupation, dates to the later Kulli period. Very small parts of the site were reused during the late Islamic or British period. A very large platform-house site of the Historic Period was



Sherd of a coarse storage jar with graffiti, Murda Sang, South Baluchistan



Polychrome knobbed Nal pottery, surface find, in southern Baluchistan



Polychrome Nal pottery from Niai Buthi, Las Bela , Southern Baluchistan

built over scattered houses and possibly fields north of the main settlement.

We now know of a number of Amri-Nal, more generally Early Harappan sites, on the coast of the Arabian Sea and its arms in Gujarat (India). Balakot is on Somiani Bay and two little known sites to the west of Karachi, Orangi and Pir Mungo, seems to have Amri-Nal assemblages. Both of these sites have now become a part of the urban sprawl of Karachi. Of the two periods of Balakot, the upper one belongs to the Indus civilization whereas

the lower one or Period I constitutes a mixed culture

wherein Nal elements are dominant. Wheel made seasonal expansion and contraction of the lake waters. This is documented at a painted pottery, generally related to Nal polychrome
site of Lohri, for example.
ity of raising both a winter crop for food grains, and

a summer crop for other cultigens. The third form of style, right from the beginning of occupation, has
been found. Humped bull figurines, microlithic tools,

Water Management:

irrigation is documented at the site of Nuka and in
The Indus Civilization is renowned for its water
volved an investment in some kind of bunding, ei

times and that it took three forms. The first is very simple, using the natural flooding of a hill stream to irrigate land to either side of the *nai* with a minimum of human intervention. This is similar to a form of cultivation widely practiced on Indus flood plain known as *sailabi*. It has been vividly documented at the site of Kohtras Buthi. The second form, documented at the site of Nai Buthi made use of small, shallow ditches to gently guide spring water out

onto a flat area that was used for cultivation. This is a useful and reliable irrigation method, and since
the springs are active all year, it admits the possibil

beads of lapis lazuli, stone, shell and paste, a lim
management practices. Louis Flam and Walter Fairservis have suggested that
ther a low earthen wall, locally known as a *kach*
ited amount of copper and miscellaneous terracotta,extensive water control technology of the Indus Civilization began in the region. Here alluvial soil was acshell and bone objects complete the other cultural
cumulated behind the steps of low dams laid across
during Amri-Nal times and that it took three forms. The first is very simple,details. the slope drainage and a water reservoir of some **Amri-Nal Subsistence Practices:**
Except
using the natural flooding of a hill stream to irrigate land to either side of the *nai*
sort was created. A typical example is the gabar
for Balakot, there are almost no remains of plants
with a minimum of human intervention. This is similar to a form of cultivation
band at Diana site on the Hab River, where the wa
and animals that have been described from thewidely practiced on Indus flood plain known as ters
were presumably accumulated in a catch basin
sailab. It has been vividly
Amri-Nal sites. There is a small report on the faunal and released slowly to the fields.

remains from Amri. It documents a pattern that is recurring at other sites, with an abundance of cattle bones and some sheep and goats. Bones of Sindhi crocodile, rhinoceros, and wild ass have also been found. The villages along the piedmont of Baluchis tan were placed to take advantage of the hill tor rents or *nais* and the natu ral springs that dot the outer face of the mountain front. Lake Manchar, the natural inundation basin of the Indus, was extensively utilized as an environment to be directly exploited for marine food and a huge, naturally irrigated farming tract, resulting from the seasonal expansion and contraction of the lake wa

documented at the site of Kohtras Buthi. The second form, documented at the



The Diwana Dam in southern Baluchistan from the Amri-Nal Phase (*after Fairservis*)

site of Nai Buthi made use of small, shallow ditches to gently guide spring water system had its beginning in
ters. This is documented at a site of Lohri, for ex
Baluchistan at least as early as the period of Nal
out onto a flat area that was used for cultivation. This is a useful and reliable
ample. At Balakot, cattle, sheep, goat, buffalo, pig, settlements. It is still practical today. Basically hare and deer of several varieties have been identi irrigation method, and since the springs are active all year, it admits the southern Baluchistan produces one crop of grain a
fied but not much use was made of the available possibility of raising both a winter crop for food grains, and a summer crop for *Khushkhaba* or rain crop. marine sources of food. The grain included six-row year. This is primarily a
other cultigens. The third form of irrigation is documented at the site of Nuka The slope of southern Baluchistan generally is from
barley, vetch, legume and Indian Jujube *(ber)*. The
north to south except on its eastern fringes, where
and involved an investment in some kind of bunding, either a low earthen wall, calibrated date-bracket is between the late fifth millocal streams (Mula, Kulachi) flow into Sindh lennium and early third millennium BC.
locally known as a *kach* system or a *gabarband*. This form of investment would
through gaps in the Kirthar range. The principal riv **Water Management:** have been useful for only the winter season.

is renowned for its water management practices.
Louis Flam and Walter Fairservis have suggested
that extensive water control technology of the Indus
Civilization began in the region during Amri-Nal

ers flow southward, however, and pass through valleys where settlements are heaviest. Thus the Hin

gol begins in the Surab region and passes through

Gidar, Gresha, Nal, and Jhau before crossing through the local coastal ranges to the sea; the Mashkai, with the Nundara, drains the region of Jebri and Gajar and joins the Hingol in Kolwa; the Porali begins in the Wadh area just south of Khuzdar and Nal and flows through the hill country to the plain of Las Bela. The Hab, of course, is the principal north- south running stream in the hill country east of Las Bela proper. These river systems with their local tributaryes were the seat of early settlements of Nal type. With the exception of Welpat tract of Las Bela, Saruna, and possibly the Godar tract, soil resources are very limited. Cultivation is best nearest to the riverbanks. However, in most of the small valleys and in parts of the large, alluvial soil is present for considerable stretches above the immediate vicinity of the rivers. These stretches can be cultivated as khuskaba fields after rains, provided there is enough rain.

Kach bunding and *gabarbands* are intended planned to collect all rainwater flowing through smaller rivulets into mainstream for filling low-lying depressions were placed across nullas that ran close to the to provide irrigation water and conserve soil re
for cultivation purposes in alluvial valleys. The low-lying depressions would retain water until the next monsoon season. During droughts, people would cluster around such perennial sources of water (Fig.4). This is a reason sites. These would appear to have been intended sources; a further indication that several millennia of
that majority of the permanent archaeological sites are situated near perennial springs while nomadic-herding for a
kach
system where the alluvial soil would set
camps are spread throughout the region. The socio-political aspects regarding these construction activities are
food production, with increasing number of humans tle behind the dam. not very clear. Whether it was a communal undertaking with equal shares for all or it was organized by an
and animals, had taken its toll on the Nal and Sohr individual landlord for his own field as is practiced by the contemporary societies is difficult to understand.

Damb landscape. Fairservis has documented and described these collective efforts of the people of Las Bela and southern Baluchistan for dams building; a summary follows.

Just north of Diwana, a local village on the Hub River nearly one hundred miles north of Karachi, a series of small stone-covered low mounds were encountered. The Hub River itself lies about 2 miles west of the site. Between the site and the river there is a belt of scrub growth on a silt soil which, given moisture, is very cultivable. The site, however, is far from the river. This initially seemed unusual, except that, as it turned out, its situation was perfectly viable. On the north of the site a nullah leads from the silt plain eastward to a gap in the front hills next to the site – distance of about 300 yards. Here the hills rise about 500 feet, and in the vicinity of the gap, which is perhaps 150 feet across, they narrow considerably into two opposing tongue-like spurs. Beyond these spurs there is a large ellipse-shape basin formed by the spurs of the front hills and the main mountain on the east.

This is a natural catch basin, and the ancient farmers took advantage of it by constructing a 25-foot-high dam of sandstone blocks across the gap. The dam was probably at one time about 75 feet long but is now broken on its northern end. In its lowest level the dam is about 25 feet thick and was certainly built to withstand considerable pressure. This natural reservoir and the subsequent

dam were apparently the *raison d'etre* for the exisOne of the Gabarband was located at 25, 51.00N- 67, 34. 05/14 E degree, near the Khirthar range. The existingBaluchistan represents a triumph over the exigentence of the site. The slope of the valley to the river wall measures 28 x 05 x 02 meters along the western side while along the eastern side it measures 18.30 x 5.80
cies of the region. The use of stone, both as boul
would have expedited control of the waters caught
x 4 meters. This side is provided with an extra support of two other walls. In its general scheme, the stone slab wall was erected and filled with soil and gravels. A rivulet flowing through seems to have destroyed its easternders and in cut blocks, gave these farmers a finebehind the dam as they were released into irrigationportion (Fig. 3).advantage in salvaging the soil and water resulting canals at the head of the slope.
Another Gabarband located at 25, 49.25N -67, 31.55E degree is a stone wall strategically built to collect the water or divert its flow towards the mainstream. A total of three walls are visible in sequence oriented towardsfrom the short but violent rainstorms usual to theseThe relationship of the Nal settlements tothe vast valley in between Gaz and Khirthar (Fig. 5).degree to which earthen embankdam building is best shown by the remarkable site regions. The
ments and wood supports were used is, of course,of Kohtras Buthi, which is situated near the head of unknown, but we can assume with some assurancethe Baran Nai valley. This valley is roughly parallel

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to that of the Hub River. However, this stream is much less voluminous. Kohtras Buthi is essentially located on a hilltop which rises some ninety-five feet above the river plain. To the west of the site, on the Taung fork, gaps in the hills are filled with massive stone walls such as at the Diwana site on the Hub. One was measured by Majumdar who found it to be about 400 feet by 30-35 feet and over 20 feet in height. At the foot of Kohtras Buthi are two stone walls across the gaps between the site and adjacent hills.

This kind of evidence strongly indicates that under the direction of skilled engineers the population was able to construct effective systems of water control which enabled them to utilize the local soil resources to their maximum. Even in distant Kharan, low stone dams measuring 4 to 5 feet high and 8 feet thick and some 100 yards or more in length


Fig. 3 A wall on the rivulet to close/restrict the flow of water

A wall on the rivulet to close/restrict the flow of water in Taung Valley, western Sindh (60)

In Kolwa, Stein also recovered evidence for the relationship of a *gabarband* or dam system to a Nal settlement. At Kallag mound two low dams were found laid across the drainage slope in successive order. These would appear to have been intended to prevent the run off from collecting into a deep nullah and so being lost. Instead, the dam would divert water to the fields lying below the slope. A similar situation also occurs at Yaghar Damb in the Mashkal River drainage of Jhalawan.



The wide distribution of Nal sites and their water-control systems in the southern reaches of that every resource was utilized in these irrigation systems.

For the wheat and barley farmers of prehistoric times who were able to build the restraining dams across the gaps in the surrounding hills or across the courses of small intermittent streams, provided a water resource in addition to the seasonal rain itself. In consequence, water could be strategically placed and more effectively used over a longer period of time than was possible by simple *khushkaba* dependence. High evaporation plus some leakage probably did not allow for storage of water in reservoirs over periods of more than a few months, or indeed in some cases for a few weeks, but

obviously for whatever period it was, the water supply was that much the greater. Almost all the major valleys and many smaller ones, like those of Drakalo, Wadh, and the Ornach, exhibit traces of strong dams on the slopes or in the gaps of the surrounding hills, attesting the first possible use of the alluvial soil in those valleys. Correlatively, extensive occupation of these valleys is proven by the number of sites of the Amri-Nal Phase.

Conclusion: We divided the Early Indus period into several regional "cultures" or phases which were more or less contemporary to each other and generally covered a time period between 3200 BC to 2600 BC. The Damb Sadaat, the Amri, and the Nal cultures belong to this tome span. Of these, Damb Sadaat phase is the hilly manifestation of the Early Harappan period, Amri culture belongs to the Indus plain bordering Baluchistan, and the Nal is generally concentrated in the central part of Baluchistan although its effects are felt down to southern Baluchistan and southwestern plains of Sindh. The Amri and Nal are quite similar in cultural traits and a large area of their influence is common. These two regional cultures are thus treated together. The epicenter of the Damb Sadaat phase is Quetta Valley but it spreads up to Kandhar in Afghanistan to the north and Shahr-e-Sokhta in Iran to the west. The regions of Zhob and Loralai to the east are also a part of this cultural phase, although some archaeologists treat these areas differently. To the south, we found the influence of Damb Sadaat phase up to Kalat.

The Damb Sadaat cultural phase of the Early Harappan is characterized by a black-on-buff pottery, which has been named as Quetta Ware. Another type of pottery is also known, i.e. the Faiz Muhammad ware, which is quite different from the black-on-buff pottery. This phase represents a very robust and dynamic time of the Early Indus period: a large number of mature farming villages thrived over a large area, the art of pottery-making reached a new height, the painting on pottery showed a skillful manipulation of geometric designs which show a remarkable affinity with that of Central Asia, the form and style of wares are diverse and beautiful. Crafts also multiplied, and the form and finish of the artifacts ran almost into the Mature Harappan period.

Archaeological evidence does not tell us much about the subsistence practices of this regional culture but it is assumed that goats, sheep, and cattle continued to be raised and barley and wheat comprised the staple. Concurrent with agriculture, we see the signs of wide-spread pastroralism which was intimately integrated with the village economy. Houses were made from mud-bricks on a boulder stone foundation. Monumental buildings are also in evidence and surprisingly these provided the centers of population.

The Damb Sadaat phase is particularly known for an abundance of human female figurines. These renderings are heavily ornamented and are distinguished by a formalized hair-do. The breasts are depicted prominently on these figurines through an appliqué technique. The eyes are unrealistically large, in fact goggled. Some early archaeologists called them "Mother Goddesses" and implied their religious connotation. These figurines have been found in the Quetta Valley as well as in the Zhob and Loralai area. Quite few of these figurines have also been recovered from Mundigak in Afghanistan. A few fine examples have been found at Mehrgarh occupation of the time. It appears that the making of this type of female figurines continued in the Mature Indus Civilization for quite some time.

Another artifact to be noted is the potters' marks or graffiti on the pottery. This is a tradition carried over from the Kechi Beg phase but now they are in profusion all over the area covered by the Dam Sadaat cultural phase. We notice the overflow of this tradition into other cultural phases, especially in

the Kot Diji phase of the northwest, to be discussed in the next chapter. The Damb Sadaat phase was the height of the hilly culture of northern and central Baluchistan that gave way to the mature Indus Civilization. The cultural and trade contacts with Central Asia were very profound and intimate, as judged by the pottery style and the paintings on pots.

There are several characteristics of the Amri-Nal phase of the Early Indus period. First, the pottery of this phase is very fine and superbly decorated in bichrome as well as in polychrome colors. In fact, the Amri-Nal pottery is the finest and the most beautiful that the Indus tradition has ever produced. Second, the agricultural settlements of AmriNal phase have been in profusion, mainly in southern Baluchistan but also in the hills up to Khuzdar on one hand and in the plains around the Manchar Lake on the other. Third, the Amri-Nal settlements generally do not have earlier habitation although quite a few of them do show the later habitation of the Mature Harappan times. Fourth, almost all the housing structures that have been excavated have a solid stone plinth on which walls of mud-bricks have been erected. This building style, although in evidence prior to this phase, continued for a long period to come almost all over the southern part of Pakistan and this seems to be a legacy of the AmriNal phase to the Mature Indus Civilization.

Probably the most significant, the Amri-Nal phase stands out, at least in archaeological terms, for its water management. It appears that the use of various types of dams was common wherever such dams could be built. This practice is significant not only from the perspective of the social cohesion, collective confidence, and engineering skills of the people but also from the perspective of history. The Harappan Civilization that followed this phase is known for its water management. It is probable that Amri-Nall phase had something to do with the transmission of dam building technology to the peoples of the mature Indus Civilization.

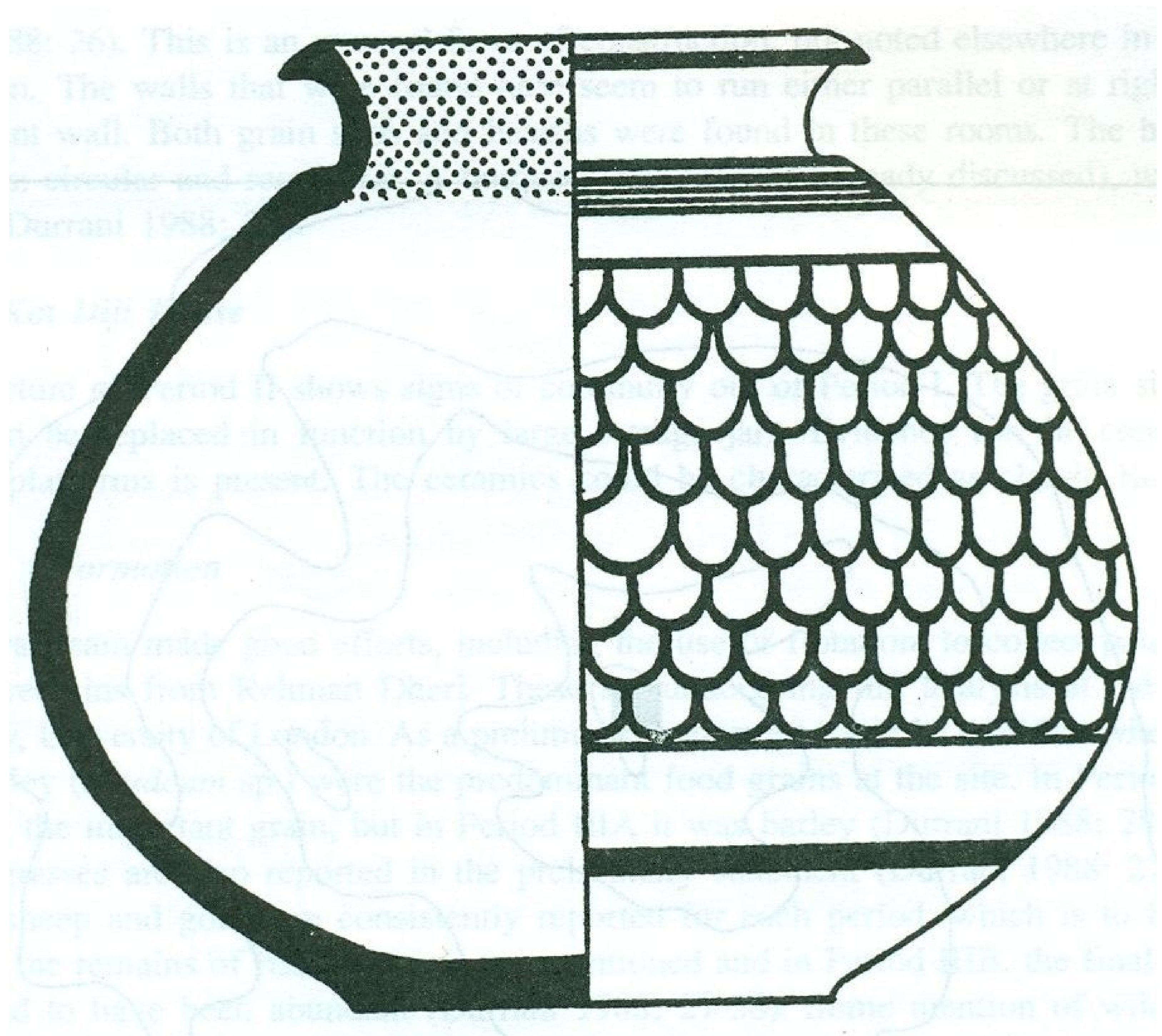
Finally, the extensive practice of irrigation by the people of southern Baluchistan strongly indicates that some summer crops, such as *jawar* and *bajra* , were being produced. It is known that these food grains originated in Africa and got transmitted to the western fringes of the Iranian plateau quite early on. The people of south Baluchistan were in a position to acquire these crops through coastal boating along the Persian Gulf or through the land route across the Iranian Plateau. If it is true, then this Early Indus phase must have contributed to the creation of food surplus on which the Indus Civilization arose. As far as the domesticated animals go, there is strong archaeological evidence for the presence of domesticated goat, sheep, cattle, and water buffalo. Hunting was concurrently practiced as the bones of wild goats, gazelles, and mountain sheep have been found at some sites. There is, however, no clear evidence for fishing or making use of any sea food..

The archaeological findings at southern sites of Amri-Nal phase show the emergence of the Kulli culture in the later part of the Amri-Nal phase. The Kulli culture is believed to thrive contemporaneously with the Harappan Civilization and is generally considered as the hilly manifestation of a riverine civilization. It can also be considered as a product of the Early Indus culture of the Amri-Nal phase. Amri-Nal phase gave way to the Indus civilization but in some areas the local Kulli culture survived for a long time into the Mature Indus Civilization.

The next chapter deals with the Kot Diji culture of the Indus plains and the Kulli culture of southern Baluchistan. The former was contemporary to the Amri-Nal phase and the latter dated somewhat later. The attention of the reader is drawn to the fact that although all these contemporary cultural phases have been treated as regional entities, they were in deed interconnected with each other and the

regional boundaries were rather fuzzy and ill-defined. The material covered in this chapter and that discussed in the next should, therefore, be considered as a whole and in terms of the overall picture of the Early Harappan period.

VI.6. Villages and Towns of the Early Harappan Phase – II



In the preceding chapter, we reviewed evidence the archaeological pertaining to the

Quetta Valley and Amri-Nal phases of the Early Harappan Phase. Contemporarily to these cultural and regional phases is the Kot Diji phase

which is by far the most expansive phase in the Early Harappan time span. Most of the sites discovered from this time period (3500 BC to 2600 BC) in the Indus plains belong to this Phase or

some variation of this phase. Compared to the Amri-Nal and the Damb Sadaat phases, described in the previous chapter, the Kot Diji Phase is basically a riverine culture although many sites do lie in the foothills of Baluchistan, and the Pashtun country. A large number of sites have also been discovered at the fringes of the Thar Desert. It takes its name from Kot Diji in Sindh, the first site discovered of this type.

Contemporary to the Kot Diji phase or somewhat later, is the Kulli Culture, which is, again, a plains' manifestation of the Early Indus period but is not a riverine culture. It pertains to the plains and valleys of southern Baluchistan where perennial rivers and water streams are only few and far between. Kulli culture is generally considered contemporary to the Mature Indus Civilization but its early periods can be safely assigned to the Early Harappan Stage of which Damb Sadaat, Amri-Nal and Kot Diji cultures are part. It flourished in southern Baluchistan and has strong affinity to the Amri-Nal culture on one hand and the Kot Diji culture on the other. In its later manifestations, one observes quite a few similarities with the Mature Indus Civilization. It must be kept in mind that although the Damb Sadaat and Amri-Nal are the hilly manifestations of the Early Harappan Stage, they are by no means isolated from the riverine culture of the Kot Diji or the south Baluchistan's culture of the Kulli. There is a strong interaction between various regions and the boundaries generally overlap, creating interaction zones which are rather fuzzy and ill-defined.

Recently another cultural phase, akin to the Kot Diji Phase, has been defined at pre-urban Harappa but it seems to more a transition to the urban Stage (Mature Harapan) rather than a Phase of the Early Harappan Stage. We may make a reference to this here and there but not treat it as a distinct Early Harappan Phase.

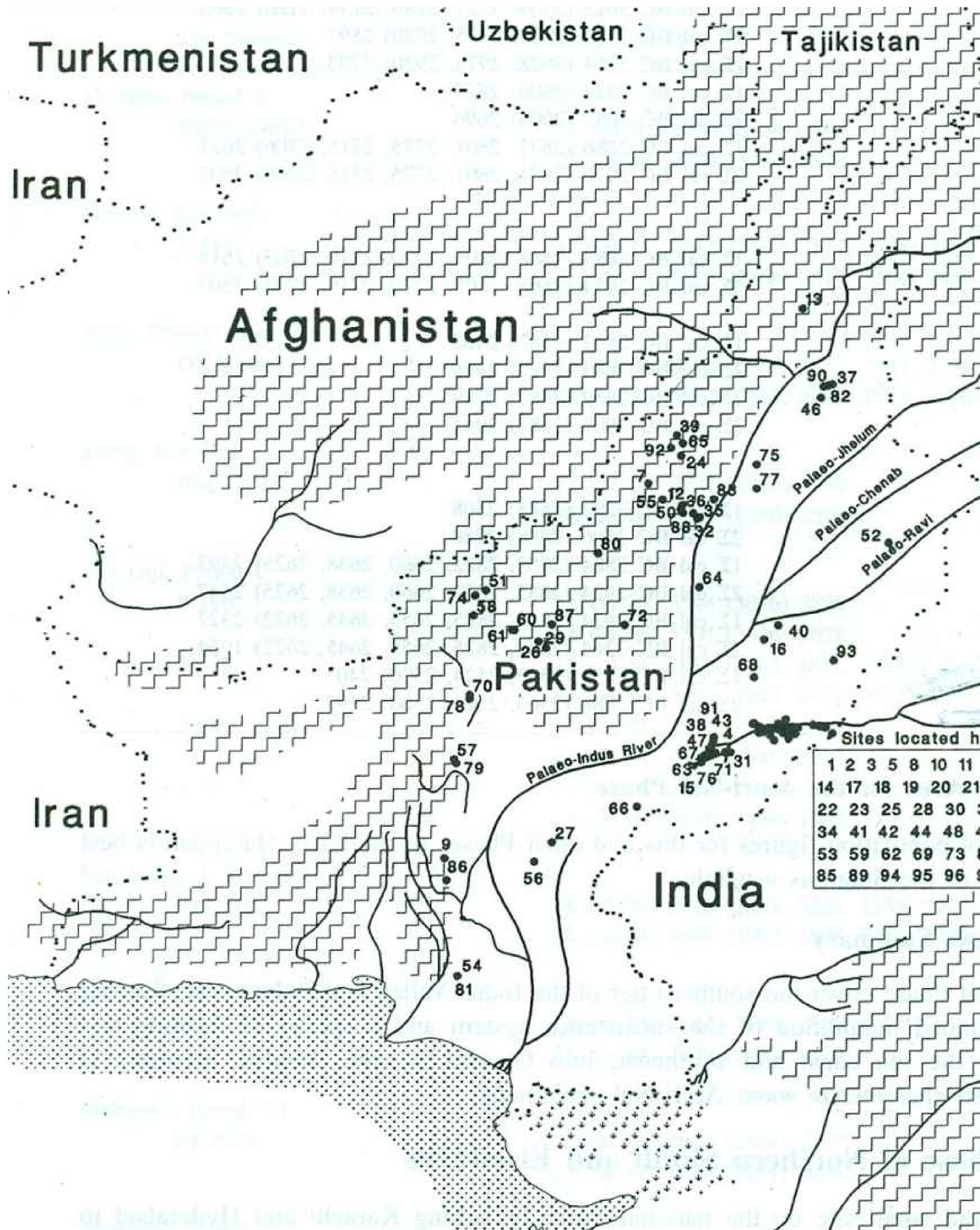
KOT DIJI PHASE

Kot Diji Phase covers the geographical area that spans from the northern part of the present-day Sindh province right up to as far as the Pothwar plateau. Its area of influence also extends to the east of the Indus of which Cholistan Desert seems to be the center. Although a riverine culture, the Kot Diji is at home in western foothills of the country, from Dera Ismail Khan to Bannu and Peshawar valleys. As stated before, Kot Diji is the largest of all Early Harappan cultural areas described in the previous chapter or to be dealt with in the present. This is also the closest in the artifacts to the Mature Harappan Civilization. In fact, if any cultural phase can be designated as the one single precursor of the Harappan Civilization, it would be the Kot Diji Phase. Just like other cultural phases of the Early Harappan, the Kot Diji is not found in its pure form anywhere except perhaps at very few sites in Sindh. Similarly, the geographical boundaries, although easily recognized, are quite blurred and fuzzy.

The epicenter of Kot Diji culture seems to be the middle of the Indus plains. However, these alluvial plains are rather poor in archaeological sites, the Kot Dijian or otherwise. Contrarily, a large number of sites, including the Kot Dijian remains, have been found in semi-arid regions, such as Cholistan and Bannu, or on the foothills of the western and northern mountain ranges, such as Gumla, Rehman Dheri, Sarai Khola, etc. This anomaly in site distribution has created a lot of confusion in the interpretation of archaeological evidence. For example, the Early Harappan sites in the Cholistan Desert outnumber those in other parts of Pakistan, including those in the alluvial plains of the Indus and its tributaries. Similarly, while one finds several settlements on the western edges of the Thal Desert, such as the district of Mianwali, we do not find any trace of the Early Harappan settlement in

the alluvial plains of Punjab.

Some Indian archaeologists and their students claim to have discovered a large number of Early Harappan sites on the Indian side of the border, along the dry bed of the Gaghar-Hakra river, the number of which is “more than all the Early Harappan and Mature Harappan sites combined in the whole of Pakistan”. This lopsided site distribution is then touted as a proof that the epicenter of the Indus culture was indeed located in the Indian Punjab, Haryana, and along the dry riverbed of the Gaghar-Hakra. Once this new easterly epicenter is established, then the expansion of the Indus Civilization necessarily takes an east-to-west direction. Quite a few western scholars have also fallen prey to this trendy interpretation, renaming the GagharHakra river as the ’Sarasvati’ without suspecting that it would soon be transformed into the Rig Vedic river “Sarasvati”.



Map of the Kot Diji Phase (after Possehl)

This is a misreading of archaeological evidence, a miss-interpretation of the Rig Veda, and an affront to commonsense. All the available evidence, detailed in the previous pages, confirm beyond any doubt the expansion of Indus Civilization from Baluchistan to the east and then across the Indus to the Hakra plains. Agriculture and pastoralism undoubtedly originated in Baluchistan, the Early settlements emerged there, and the mature agricultural villages first developed in that part of Pakistan. Furthermore, all the known urban centers have been discovered in the Indus Valley. The villages situated around these urban centers, obviously, cannot be fewer in number than those situated at their peripheries. Looking from another view, the arid zones cannot be thought more densely populated than the fertile plains of the Indus.

This anomaly stems from the disappearance of the Indus villages under the alluvium of the rivers, destruction of sites by inundations and man's deliberate actions in his quest for bringing the rich alluvial land under cultivation. Under these forces, it is natural that we do not find as many preserved archaeological sites in the alluvial plains as those in the arid or semi-arid zones that escaped the deposition of alluvium, destruction under inundations, and a lack of economic development in the area. This applies especially to the Kot Diji sites because this phase was largely riverine in nature. These villages most likely thrived in the Indus plains but apparently vanished to escape our detection for some of the reasons mentioned above.

The sites of the other cultural phases, such as the Quetta Valley, Amri-Nal, and Kulli, were largely situated on the slopes of the hills and in the valleys of Baluchistan mountains, and the chance of their survival was much better. In short, the apparent sites density of the Kot Diji cultural phase as well as that of the Indus Civilization should not be equated with the population density in the Early Harappan period and beyond. Possehl has well emphasized this point in his *Indus Age - The Beginning.*

The Kot Diji phase is particularly significant in view of the urban civilization that arose soon after in the same area but a comprehensive and wellrounded account of the Kot Diji Phase is not yet available: the following description of a few important sites, along with the attached illustrations, should give the reader a glimpse of this cultural phase.

Sincetradecontactsbetweendifferent groups of peoples settled in the Greater Indus Valley are evident right from the early Neolithic time in the seventh millennium BC, these contacts must have continued and expanded in the Early Harappan Phase. It appears that during this period some settlements located at important crossroads of trade and exchange networks with access to rich agricultural lands or important raw materials grew into large villages or small towns. For example, from 3300 BC to 2600 BC the small agricultural village at the site of Harappa grew into a large town of over 15 hectares. Other settlements of the same time located in the hinterland around Harappa and other large towns are all much smaller.

We are especially blind when it comes to the subsistence strategy of the Kot Diji phase because we have virtually no evidence as to the kind of crops cultivated in the oKt Diji areas. However, it could not be any different from other contemporary cultures in the Greater Indus Region. In the Mature Harappan period, wheat and barley are attested and were presumably the staples of that urban civilization. We can, therefore, assume a similar wheat and barley dependence in the Early Harappan Stage, includingg the Kot Diji Phase. What is unclear is the difference in variety of these crops between that originally grown in Baluchistan and that now grown in the riverine plains of the Indus Valley. Similarly, while cattle, sheep, and goats are evi

Early Indus—III!
In Search of Cultural Sequence
denced at these settlements, we cannot be certainthe Thal Desert. Although this area is near
these are the same as those of the highlands of
Baluchistan. Bannu, very little similarity in the artifacts
Kot Diji:
has
been
Kot Diji is a splendid small site onnoticed. It appears that the
the national highway linking Hyderabad to Sukhur. ItMianwali settlements are more 'Kot Dijian'
is situated on the old alluvium of the Indus Valley, a below a huge Talpur Fortress. The Pakistan Dethan those in Bannu area. Apart from
partment of Archaeology conducted an excavationgeneral survey and surface exploration, no there in 1955 and 1957 under the direction ofarchaeological work has yet been undertaken.F.A.Khan. An analysis of the site was one of the

primary foci of M.R.Mughal's Ph.D. dissertation and There is no coherent report available either.
he created from it the "type site" for his Early
Harappan period. Kot Diji was first recorded as an
archaeological site by G.S.Ghurye in 1936. Ghurye
did not excavate at Kot Diji, but he did make a sur

Early Indus—III! The Kulli Culture

face collection from the site that is now at
P.W.Museum, Bombay. The stratigraphy of Kot DijiThis cultural complex is named after a site
is complex and the best reconciliation of the situa

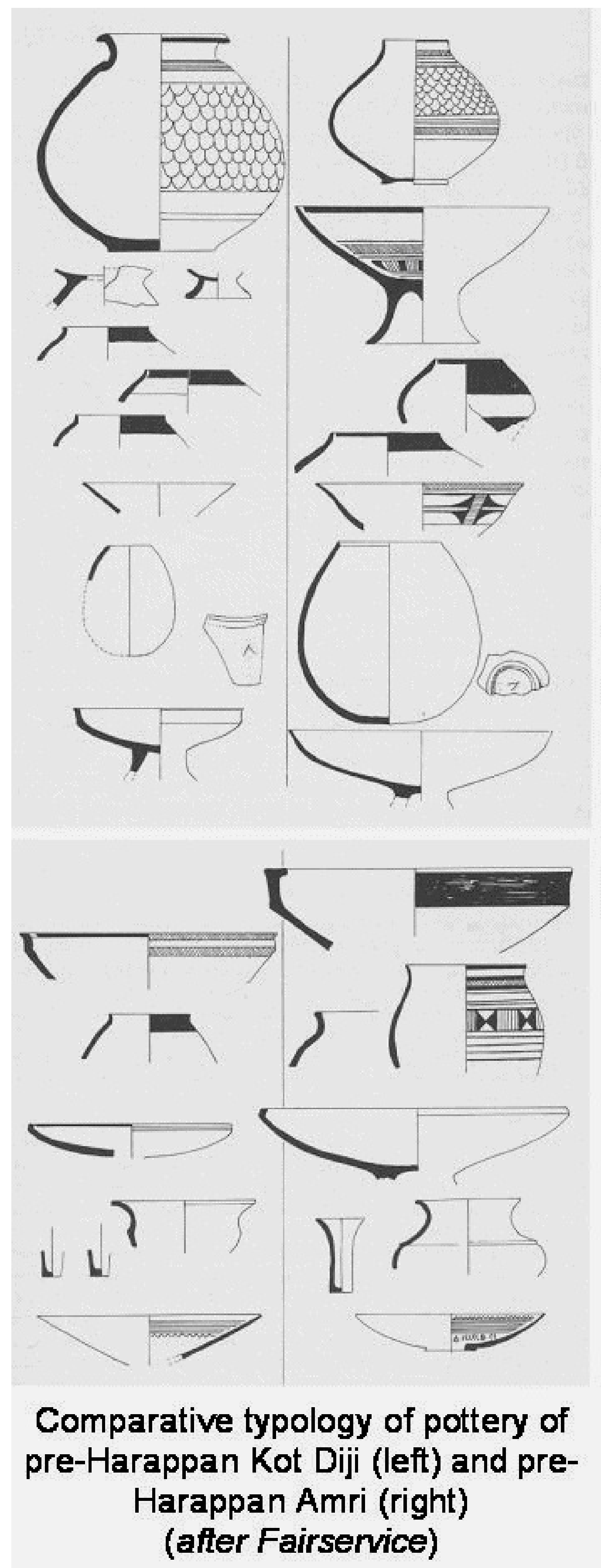
in Kolwa which was discovered by Aurel
tion is the one proposed by M.R.Mughal. There are
epicenter is established, then the Stein. Since then, several other sites became
two periods separated by a burnt level. The burning

was found everywhere and represents a large scale known from Makran to southern Kalat, to
conflagration which seems to have enveloped and
destroyed the entire settlement. Large scale burning Nausharo in the Kachhi plain, and to the

has also been documented at Amri and Nausharo at
eastern foot of the Kirthar Range in
the historical junction of the Early Harappan/Mature
southwestern Sindh. Some motifs and vessel

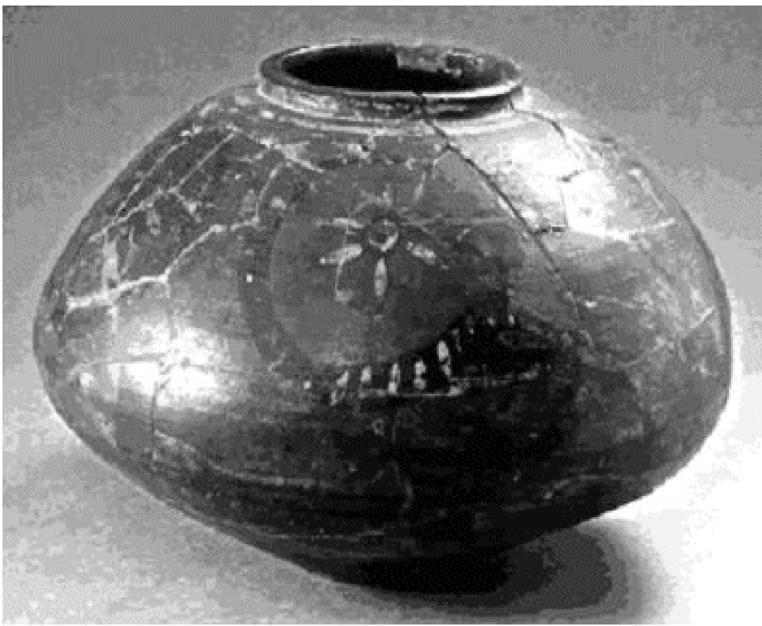
shapes found in southeastern Iran and on the
Arabian Peninsula, are sometimes also linked
of to the Kulli and seen as indications for long
distance contacts. These affinities are,
however, weak.

to the During his tour of Gerdosia, the Greek name for southern Baluchistan and Makran, Stein uncovered several prehistoric sites, some of

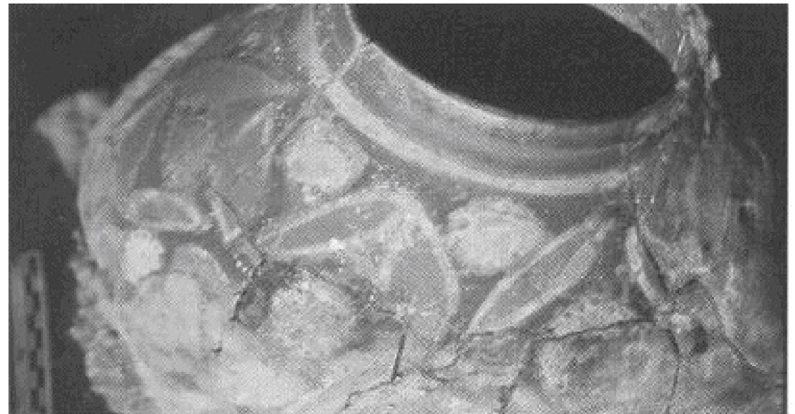


Comparative typology of pottery of pre-Harappan Kot Diji (left) and pre-Harappan Amri (right) (*after Fairservice*)

them he briefly excavated. Kargushki Damb,



A Kot Diji vessel. Note the horned head of a buffalo. It is a common theme in the Kot Diji Phase as well as the Mature Harappan period.
(*Pakistan Department of Archaeology*)



Hand-built pot with intersecting-circles motive, Harappa

The Kot Diji ceramic assemblage (after Possehl)
The upper levels of Kot Dijian phase at the site of Kot Diji contained the mudbrick walls, often
Kulli, Mehi, Nundara, Shahi Tump,
undoubtedly
A Kot Diji vessel. Note the horned head of a buffalo.
A Kot Diji vessel. Note the horned head of a water
the
It is a common theme in the Kot Diji phase as well
as well as in the Mature Harappan period*Pakistan Depart*
ment of Archaeology)
agriculturalHarappan Transition.
with stone foundations, of houses where, in some Niai Buthi, Nindowari, and Sutgakencontrast to
Amri and other sites of western Sindh, the inhabitants of Kot Diji lived at the ground level.
dor can be specifically mentioned in
as the Mature Harappan period (Mud brick floors, large underground storage ves
context of the material covered in this
sels, and fireplaces, often brick-lined, were common
chapter. Many of these sites are located
to these houses. In one case a stone-lined drain The site is relatively small, being only aboutin
strategic positions, on top of mountains or terrace hills, overlooking the was built into the lower
layers. Some of the house six hundred feet by four hundred feet. Khan re
walls are massive, measuring up to five feet in

valleys and controlling the plains and passes . Other sites are small hamlets built

vealed that the upper levels of Area A Period I to III were Harappan and that the lower levels to bedrock belonged to an assemblage he called the Kot Dijian. Kot Dijian, while having its local aspects, is, however, a variant on the Amri-Nal cultural type, whose remains have been described in the preceding chapter. The often exuberant painted designs familiar in Baluchistan and southern Sind are rare here, but in general the equivalences are more than casual. There are also some analogies to material from the Quetta sequence, including potters' marks.

thickness. The upper levels of the Kot Diji occupa

tion are characterized by buildings with solid stone foundations and mud brick superstructures. This was high quality work. Khan and his team revealed large brick-lined ovens which he calls community oven. In addition, a kiln complete with funnel was unearthed.

The Kot Dijian levels on the high part of the site (Area A) were surrounded by a thick, high wall. The base of the wall rested on bedrock. A mud-brick revetment rested against the outer face while at the corners "bastions" were constructed. Apparently this wall enclosed the entire settlement in its early

stages, but later some of the inhabitants lived outside the walls in what Khan calls the "lower city". The wall around the settlement was an early feature of the settlement, apparently associated with the second occ.upational stratum. This was referred to as a "defense wall" or a "fortification wall" by F.A.Khan. However, this may not be the case. Walls have been constructed around settlements for many reasons other than defense. They tend to mark the limit of settlements, and in the case of Kot Diji seemingly would have set of Area A from Area B. The walls of this nature are useful in regulating the comings and goings of men and beasts. They are also good for show, marking the location of a special settlement. These multi-purpose walls are also

Kot Diji Phase

the feature of Mature Harappan sites and have during Mature Harappan times.The "Horned Deity" on a pot is one of the most famous objects from the prehistoric period of Pakistan. The shape of this vessel carries over into Mature Harappan times and the horned headdress is one of the important themes in the iconography of those times as well.

Bannu Basin: The 70x80 km sedimentary basin of Bannu is surrounded by hills on all sides, with the high mountains on the Afghan border on the west and northwest. The Kurram and Tochi rivers provide the perennial drainage and some major communication lines with Afghanistan, and although vegetation at present is highly degraded, what has been suggested for Baluchistan may also be suggested for Bannu: there is no clear evidence of climate change over the past few millennia. Irrigation is practiced along the river courses but dry-farming areas depend more on pastoralism than on agricultKot Diji phase covers the geographical area of Pakistan that spans from the ture. Of all the sites excavated in the region, Sheri

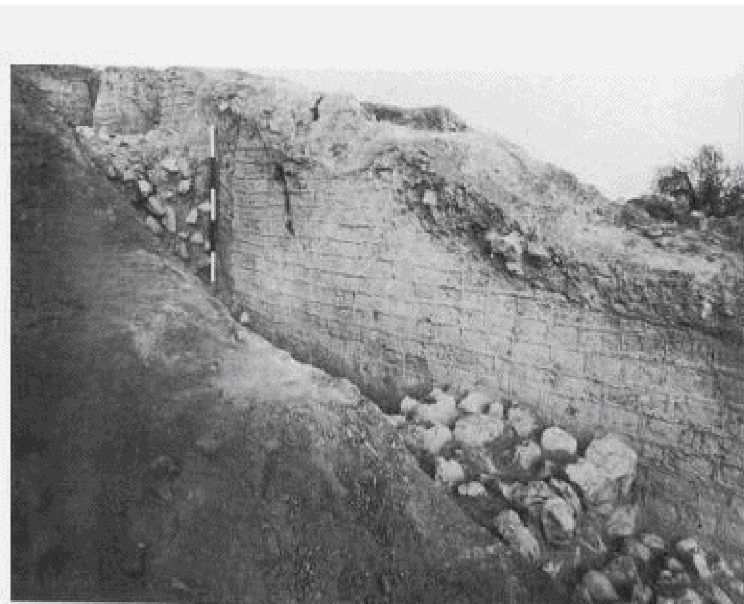
Khan Tarakai, located on the bank of anorthern part of the present-day Sind province right up to as far as the Pothowar non

plateau. Its area of influence also

extends to the east of the Indus
of which Cholistan seems to be

are the center. Although a reverie

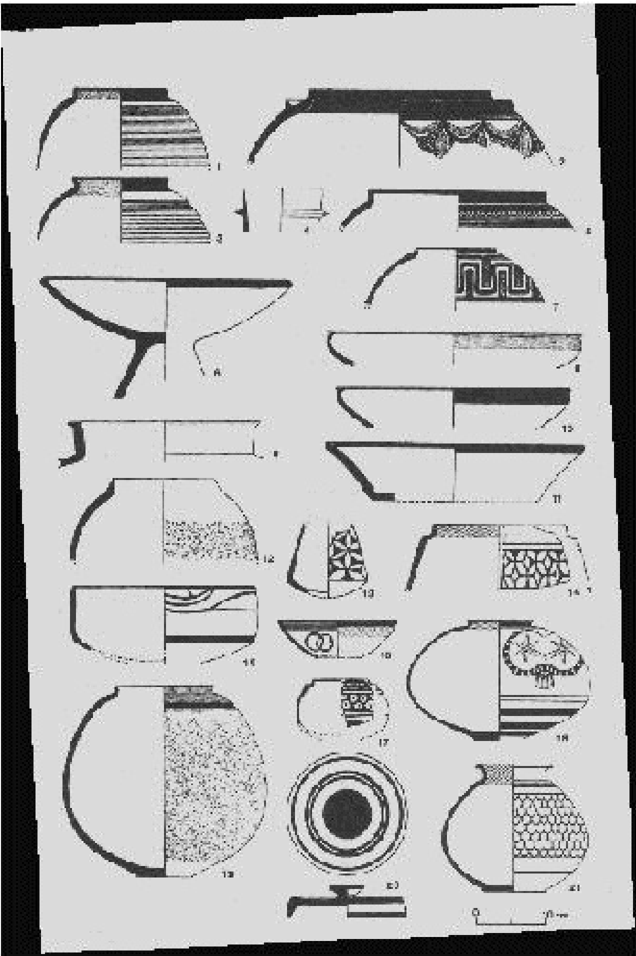
culture, the Kot Diji is at home
in western foothills of the
country, from Dera Ismail Khan
to Bannu and Peshawar valleys.
As stated before, Kot Diji is the
most expansive of all cultural
phases described in the previous
chapter or to be dealt with in the
present one. In fact, if any


Kot Diji, stone foundation and mud-brick superstructure

(*Pakistan Department of Archaeology*)

cultural phase can be designated **Kot Diji, the High Mound circumvolution showing**
as the one single precursor of
Kot Diji, stone foundation and mudbrick superstruc
stone foundations and mud brick superstructures
Indus Civilization, it would be the Kot Diji phase. Just like other cultural phases of the Early Indus, the Kot Diji is not found in its pure form anywhere exceptperennial stream of the Tochi system, is the most
important, both because of its antiquity and the perhaps at very few sites. Similarly, the geographical boundaries, although easily

have

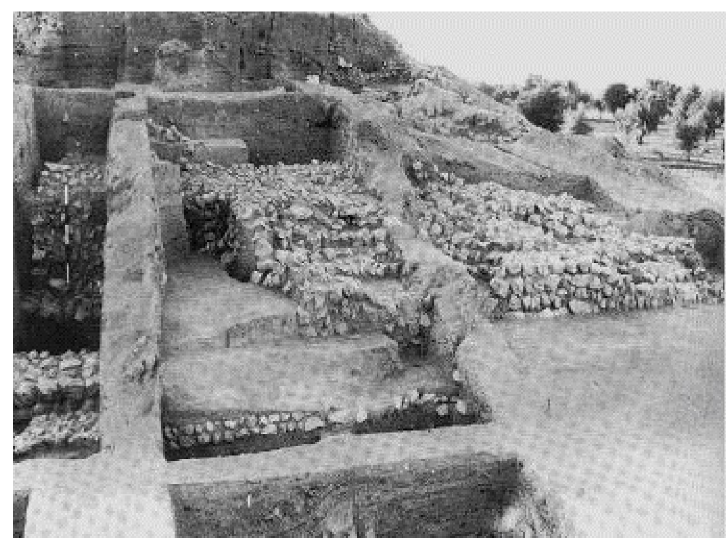


The Kot Diji ceramic as-
semblage

Kot Diji ceramic assemblage

clearly documented details of cultural remains. The calibrated date range is
ca.
discernible, are quite blurred and 4500 BC - 3000 BC. fuzzy. It takes its name from a
The work of the Bannu Archaeological Project has shown that in the Bannu region there were two
type-site of the same appellation.
distinctive cultural phases before the oKt Diji. Sheri
The geographical area covered by
Khan Tarakai presented a previously unknown cul
the Kot Diji phase is large. We
tural assemblage, primarily characterized by distinc**The Kot Diji ceramic assemblage** (after Possehl)
tive hand-made ceramic vessels decorated with aconfine our

meaning in

shall, however,
combination of geometric and zoomorphic motifs.
discussion only to a few typical

Subsequent excavations at the site of Lak Largai been the features of cities and towns throughout the history of Pakistan ever since.

The vessels from the lower levels of Kot Diji
Phase are rather austere, but the fabrics are very
fine and clean and the surface well finished, giving
them an elegant quality. The fish scale pattern on a
sites. revealed ceramic forms with distinctive polychrome

decoration that were first seen at Lewan in the The accumulating evidenceBannu region and also in the early levels at Rehman Dheri in the Gomal Plain. However, the dis
indicates that not only was a
covery of discrete deposits at Lak Largai containing
descent into the Indus Plains (
Pakistan
only this material showed that it was chronologically
made by prehistoric farmers of small pot is significant since that motif is important *Department of Archaeology)* distinct from, rather than being a component of the
Kot Diji assemblage. The existence of one or other Baluchistan but also their 439 activities carried them far into the alluvial plains of the Indus and its tributaries. The adaptation to the new environment, an environment of riverbanks and flood

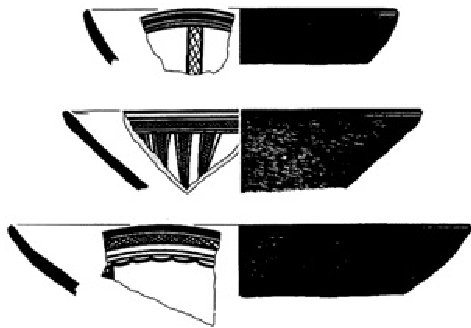
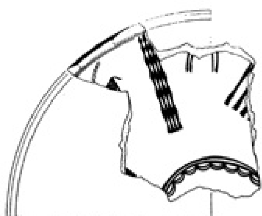
of these two phases has been confirmed by investi T gation of a number of other late prehistoric sites in the region that have comparable cultural material, including Girdai, Ter Kala Dheri, Lewan, and Islam Chowki. Material including ceramics, terracotta figurines and lithics from surface scatters such as Barrai Khuarra have shown that there was also occupation at what appear to have been pastoralist camps, contemporaneous with each of the pre-Kot Diji phases.

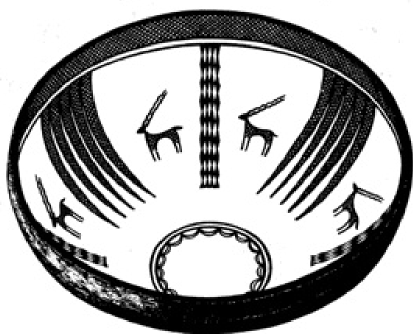
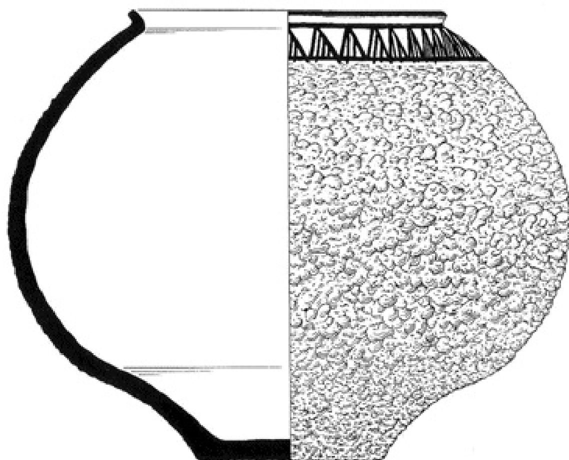
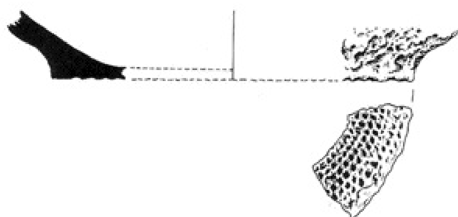
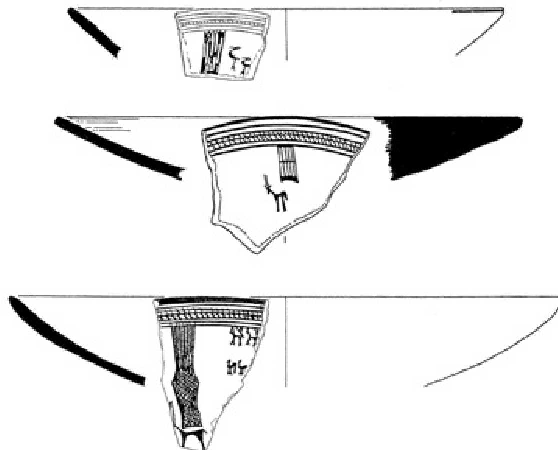
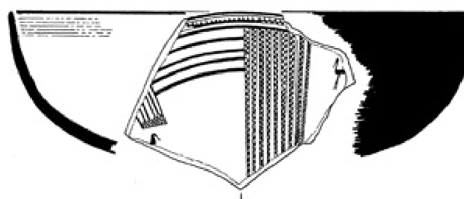
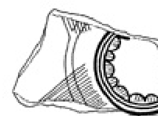
The third millennium BC levels in Bannu are associated with the Kot Diji culture of the plains and have been excavated at Tarakai Qila, Lewan, Islam Chowki andLake Largai, all in the TochiBarab area. At Tarakai Qila, mud-brick architecture with massive walls in places has been found along with wheat, barley, lentil and field-pea, whereas at Lewan there is only a series of excavated pits without

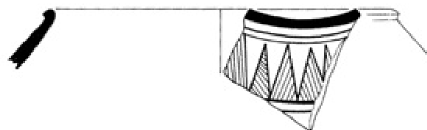
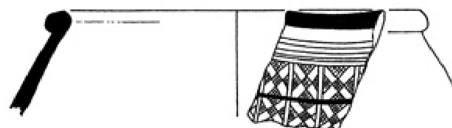
any clear architectural

Examples of non-Kot Otherwise, association. however, Le**Diji pottery from the** wan gives the impression

lower levels of Sheri

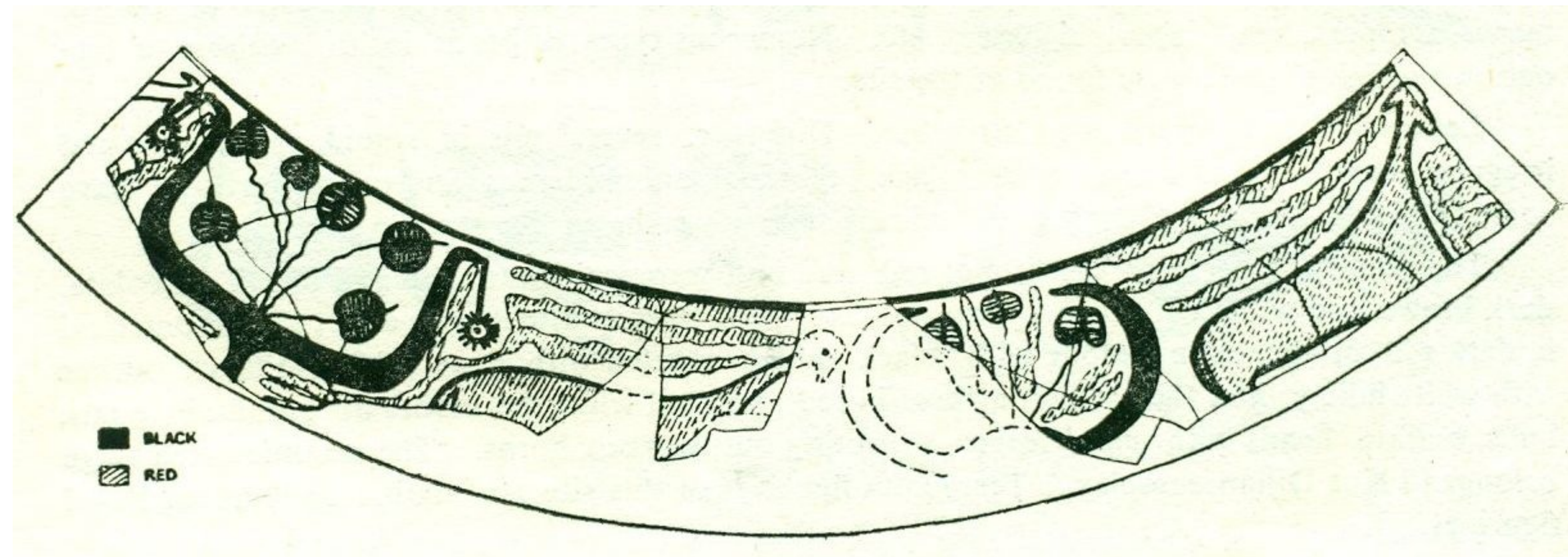
0 5 10 15 cm

Sheri Khan Tarakai

Jhandi Babar A

of being a production site **Khan Tarakai**
ceramicsfromthe of stone objects like *2.Examplesof BannuBasinandtheGomalPlain.*

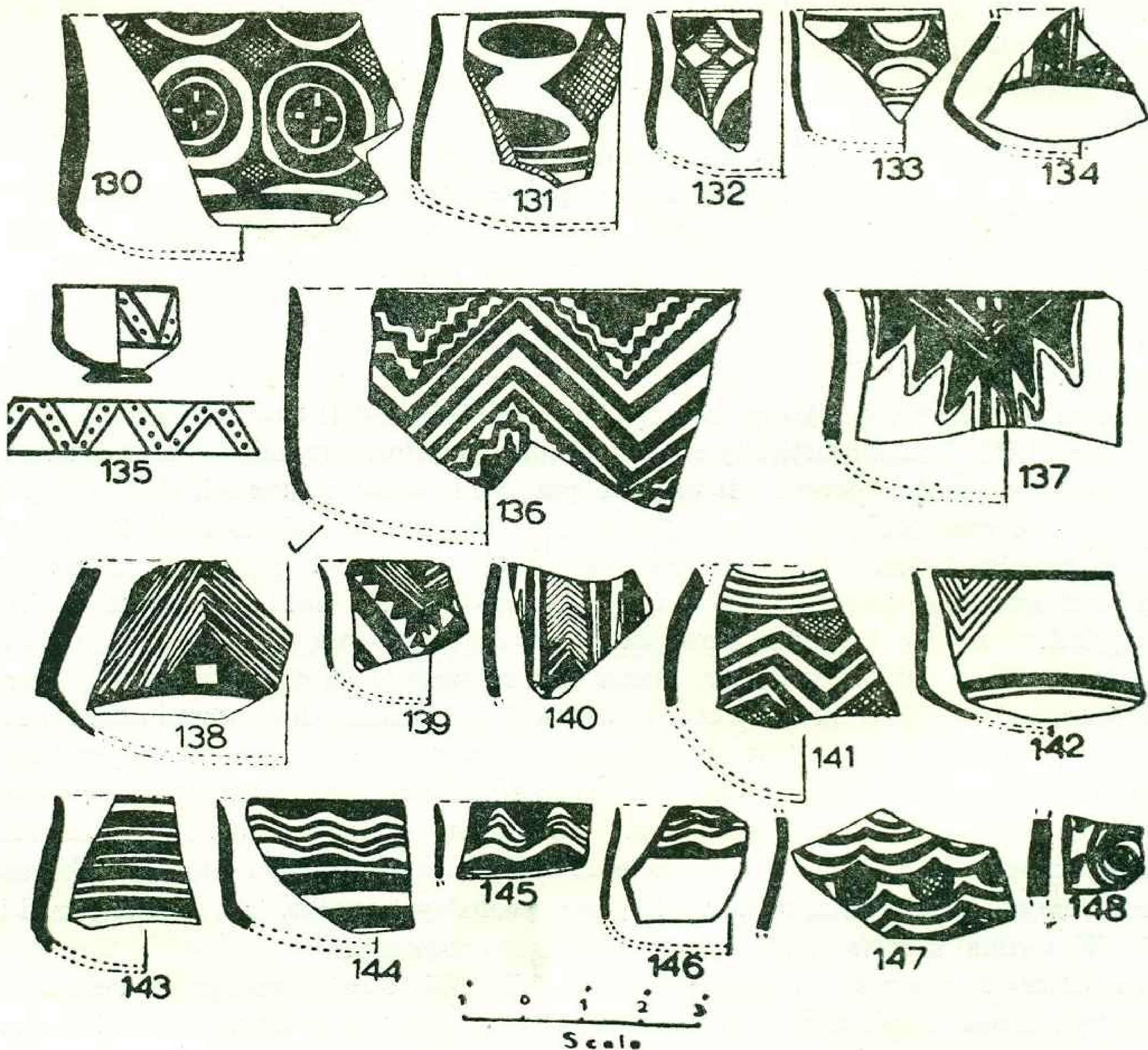
querns, mullers, ground stone artifacts, etc. Islam 77 Chowki is interesting for the evidence of a damaging flood during its prehistoric occupation which has among other things sheep, goat, cattle, ass, wheat and barley. Lake Largai had, in addition, bones of rhinoceros. On the whole, the Bannu basin offers an uninterrupted sequence of village occupations right from the middle of the fifth millennium BC.



Pottery from Gumla IV: Late Kot Diji Phase. Note the perforated Harappan vessel (*after Dani***)**

Mud-brick houses on stone foundations were common, along with impressive set of saddle querns and mullers, ring-stones, ground celts, microlithic stone tool industry, bone tools, occasionally painted terracotta bull and sheep, goat, cattle, female figurines, terracotta spindle-whorls, cultivation of barley, use of sheep, goat, cattle and water buffalo, freshwater gastropods suggesting a greater reliability of water sources in the past, shank shells of the Indian Ocean variety, and two major categories of painted pottery. One of these is a coarse handmade type thick black-slipped exterior and a burnished pinkish buff to cream-slipped interior with black or brownish painted designs which include standing caprids. The external surface of the second type is roughened with the application of a thick slurry of clay, although the neck and the shoulder may be unroughened and decorated. Interestingly, metal is absent in this level which is thus considered ‘Neolithic’.

Gomal Region: Like the Kachi plain in northern Baluchistan, the Gomal valley juts out of the Indus alluvium towards northeast Baluchistan and Afghanistan. Until recently our knowledge of this region came from excavations at the sites of Gumla and Rehman Dheri in the northern part of the plain. However, in 1997 members of the Department of Archaeology, University of Peshawar, discovered a low mound in the southern part of the Gomal Plain, which has since been referred to as Jhandi Babar A.



Painted pottery from Gumla II

Gumla: Gumla is a small site of a little more than one acre, and ends up with the Indus Civilization. Period I is aceramic and shows microliths, domesticated cattle bones, and large shallow pits used for cooking or roasting of meat. Period II has a wide range of painted wheel-made pottery, some with 'Quetta ware' designs and some with 'Kot Diji' forms. Microlithic tools, a limited amount of copper and bronze and terracotta bangles, toy carts and cattle and female figurines make up the artifactual horizon of Gumla during this time period. Period III is dominated by Kot Diji pottery forms and designs and the appearance of a new terracotta female figurine style, but otherwise there is continuity of occupation. Period IV belongs to the Harappan Civilization, mixed with Kot Dijian artifacts and pottery.

No complete building plans are available from Kot Diji Phase but fragments of mud bricks have been

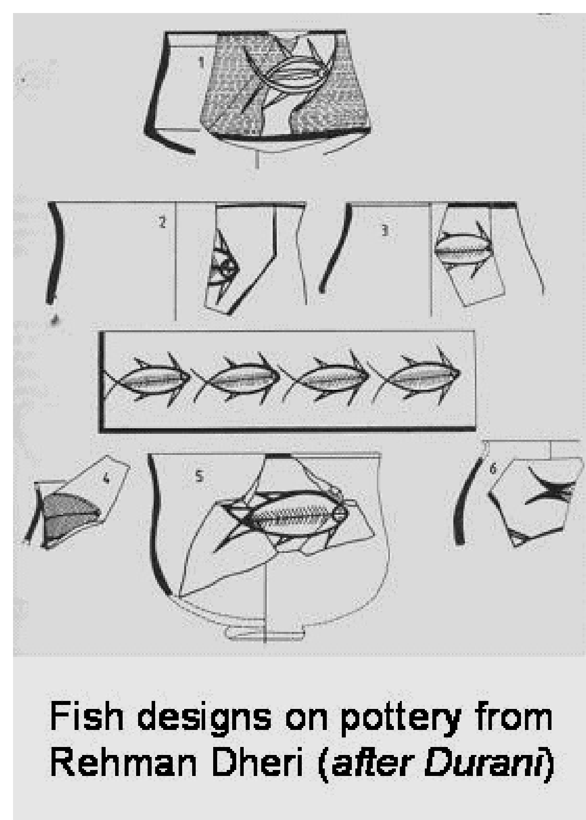
recovered. A wide range of other implements is present, including three copper artifacts, beads, bangles, ground and chipped stones and figurines.

Early Indus—III

One conch bangle indicate some long distance !trade or exchange. Period III seems to have come to a violent end, with an ash layer separating the

The only relevant excavation in this region is Sarai

two occupations. There is, however, a remarkable degree of cultural continuity between the two occupations. Late Kot Diji Phase of Gumla, Gumla IV, is



Fish designs on pottery from Rehman Dheri (*after Durani*)

Early Indus—III!

and sheep, goat, cattle, female figurines, terracotta spindle-whorls, cultivation of barley, use of sheep, goat, cattle and water buffalo, freshwater gastropods suggesting a greater reliability of water sources in the past, shank shells of the Indian Ocean variety, and two major categories of painted pottery. One of these is a coarse handmade type thick black-slipped exterior and a burnished pinkish **Fish designs on pottery from Rehman Dheri (*after*** buff to cream-slipped interior with black or brownish painted designs which

Durrani)
include standing caprids. The external surface of the second type is roughened

Rehman Dheri | Indus Script | Rehman Dheri | Indus Script | Rehman Dheri | Indus Script | Rehman Dheri | Indus Script

Durrani's chart of potter's marks from Rehman Dheri in comparison with Indus script *(after Durrani)*

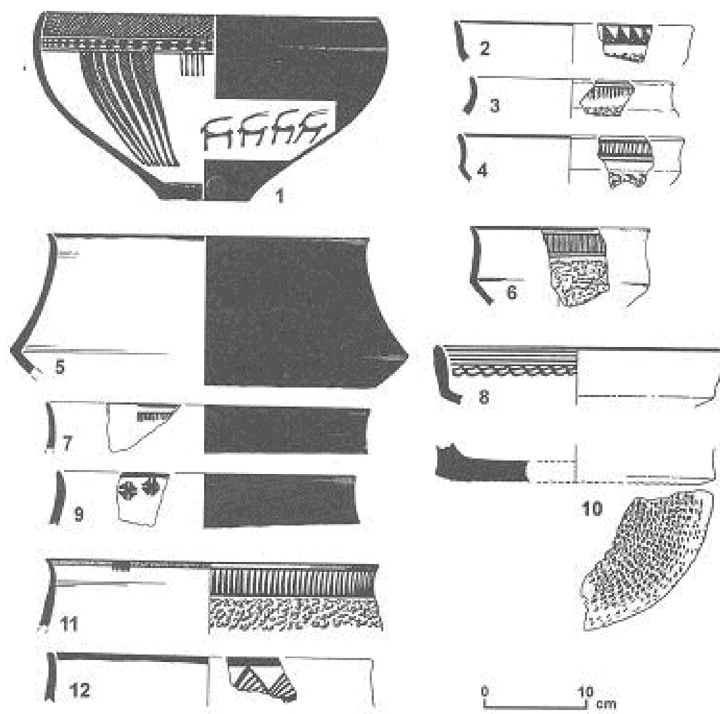
Durrani's chart of potter's marks from Rehman

with the application of a thick slurry of clay, although the neck and the shoulder may be unroughened and decorated. Interestingly, metal is absent in this level **Dheri in com[raison with the Indus script.** which is thus considered 'Neolithic'. **Left columns: Rehman Dheri; Right columns:**

The third millennium BC levels in Bannu are associated with the Kot Diji culture **Indus scrip**t of the plains and have been excavated at Tarakai Qila, Lewan, Islam Chowki and

the most important, both **Page 303** **because of its 441**

located: one is a simple,



Ceramics of Sheri Khan Tarakai
(*after Khan and Knox*)

domesticated cattle bones, and large shallow pits used for cooking or roasting of curving line of stones set in Early Indus—III

A Prelude to Civilization

meat. Period II has a wide range of painted wheel-made pottery, some with

place, the other is part of a

rectilinear structure with what ‘Quetta ware’ designs and some with
The Pothowar Plateau: The only relevant excavation in this region is Sarai
might be attached wall or part ‘Kot Diji’ forms. Microlithic tools, a
Khola whose Period I has ground stone celts, terracotta wheels and toy cart
of Shei Khan Tarakai has a tools, bone points, hand terracotta bangles, toy carts
and cattle frames, microlithic
few parallel with surrounding and female areas. The excavators see made pottery
with basketry-impressed base, andartifactual horizon of Gumla during
thiscorrelates with Periano no metal. The transition period II was gradual,
Ghundai in Waziristan as well time period.. Period III is dominated by
hand-made pottery being replaced with wheel
as Jalilpur and Hakra Wares Kot Diji pottery forms and designs and

made type. An example of this kind is a red jarthe appearance of a new terracotta female and varied collection. This is basically an undis

stone. No metal is in evidence.
good sense because the Hakra tinguishable flake tool making tradition, lacking in

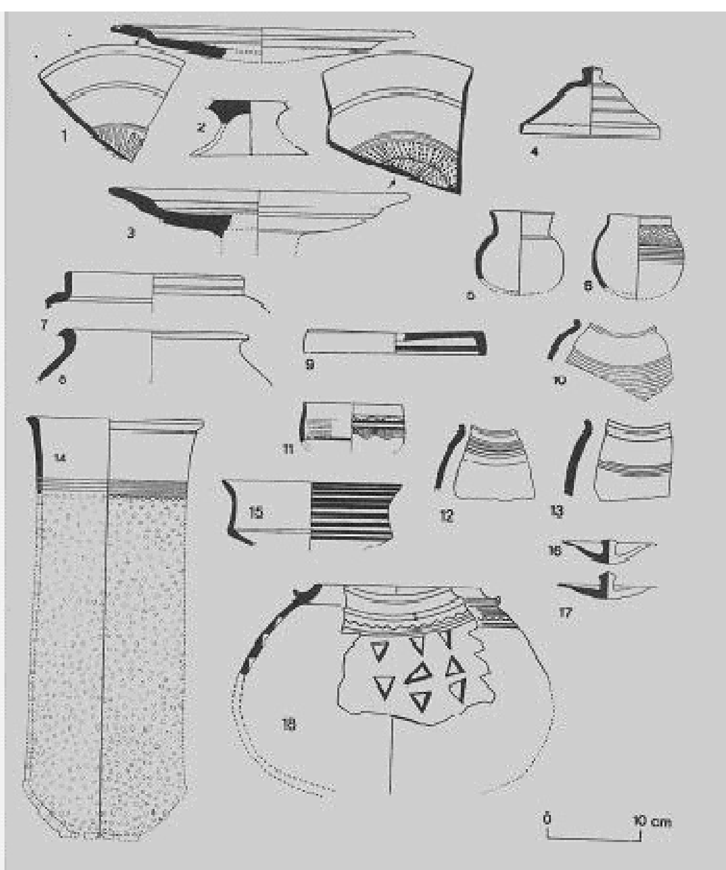
with a short neck and a large elliptical body, and Wares sites are contemporaryboth humans and cattle was found at Sheri KhancontinuitySheri Khan Tarakai are in a very fragile state andpainted black at the neck and shoulder. This is a have not been completely analyzed. They include are recognizable type for the region at the time.belongs to the Indus civilization, mixed typical Kot Diji form, more of which has been The first has no shoulders and a stem-like body,with Kot Dijian artifacts and pottery.is confined to the Bhawalpur area of the Cholistan found in this period, along with some copper,

usually with a pinched face and appliqué breasts. Desert.

artifacts, most in terracotta, but included bone and stone. No metal is in No complete building plans are availableThe other type has a bottle like torso with shoulterracotta and shell bangles, microlithic andders and reduced arms. The bull figurines from from Kot Diji Phase but fragments of the great Thar Desert, which geographically sepa

Sheri Khan Tarakai are not remarkable, but ratesA large collection of terracotta figurines of both humans and cattle was found at
document the participation of the inhabitants of
Painted pottery from Lewan

ground stone artifacts, terracotta cattle figurines,mud bricks have been recovered. A wide toy cart frames, sling pellets, stone beads, etc.range ofshow



Pottery from Gumla IV, Late Kot Diji. Note the perforated Harappan vessel (*after Dani*)

type for the region at the time. Two quite similar to those of Baluchistan, showing a

There is no radiocarbon date but Period II should general bangles, ground and chipped stones and types belong to the second half of the third millennium figurines. One conch bangle indicate some long distance trade or exchange. and a stem-like body, usually with a Indus. In the east, its natural boundary is the Thar BC.

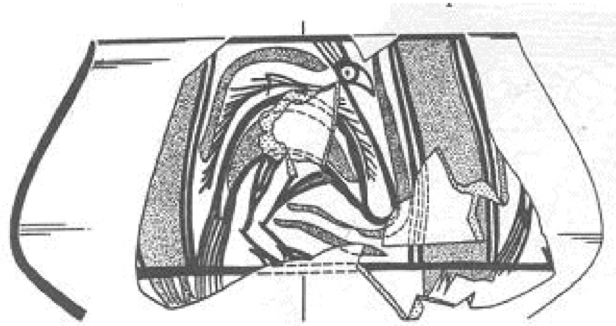
Desert. The western fringes of the Thar Desert

Period III seems to have come to a violent end, with an ash layer separating thepinched face and appliqué breasts.
Bannu: The 70x80 km sedimentary basin of Bannu is surrounded by hills on all

The other type has a bottle like torso er,also called the ‘Hakra Depression’. The climate of Cholistan is arid, annual average rainfall is not

between the two occupations. Late Kot Diji Phase of Gumla, Gumla IV, is the with

shoulders and reduced arms. The
sides, with the high mountains on the Afghan border on the west and northwest.figurinesmost flourishing period in the life of Gumla village. Mud bricks of the same size an un-estimated but large number of economically
The Kurram and Tochi rivers provide the perennial drainage and some major (*after Khan*)as Period III are common and a few baked bricks of 11x5x21/2 inches weredocumentlocated on the surface.communication lines with Afghanistan, and although vegetation at present is inhabitants of the site in this tradition.collected in community ponds called



Cranes painted bowl from Sheri Khan Tarakai
(*after Farid Khan*)

highly degraded, what has been suggested for
The ceramics can be classed with the Late Kot Diji assemblage found elsewhere,close to the permanent village settlements. They the site in this tradition.A large number of terraBaluchistan may also be suggested for Bannu:especially in Bannu (Tarakai Qila, Lewan) just to the north of the Gomal Plain.Page 216
cotta cones with a carefully made hole in one end, nomads exchange their products for manufacwhich does not go all the way through, were rethere is no clear evidence of climate change
At Gumla this includes perforated ware, akin to Urban Phase of Harappan type. covered from Sheri Khan Tarakai. Although the Thus,A range of other artifacts that would be associated with Mature Harappan was over the past few millennia. Irrigation is populations exist independently, each group utilizvators note that these objects have parallels topracticed along the river courses but drying a different ecological niche, they are interdethe north. Three small terracotta objects thought pendentpossibly to have been boat models were found. essential components of the larger, well-knit and
These fall just short of being completely convincPage 300farming areas depend

more on pastoralism than viable social and economic system of the region.ing as boat models, but are extremely interestingon agriculture. Of all the sites excavated in the The present-day analogy can be projected back objects. Jungal painted pottery from Rana Ghuninto the prehistoric past because convincing ardai, Kechi Beg Phase (*after Fairservis)*

Carved ivory pendants from Rehman Dheri Terracotta region, Sheri Khan Tarakai, located on the bank chaeological evidence for such an interaction has

bangles, always in a crude fabric with a red slip(*after Durrani*) been discovered in Cholistan and elsewhere, es were found but



Carved ivory pendants from Rehman Dheri (*after Durani*)

werennot common. This is in con

of a non-perennial stream of the Tochi system,trast to other Kechi Beg sites in this region. A large number of beads, in a variety of thelows, it should be pointed out that the original pat colorful stone, including lapis lazuli, turquoise and is tern of domestic settlements and other types oflimestone, was found at Sheri Khan Tarakai.
antiquity and the clearly documented details of cultural remains. The calibrated

These stones, and the occurrence of shell frag

date range is c. 4500 —3000 BC.ments, are indicative of the wide contacts of the

ancient inhabitants of Sheri Khan Tarakai. Twenty
three bone tools have been reported; these in

intact because economic development in the region has been slow. Difficulties of developing the desert extensively have saved the ancient sites

the most flourishing period in the life of Gumla village. Mud bricks of the same size as Period III are common and a few baked bricks of 11x5x21/2 inches were located on the surface.

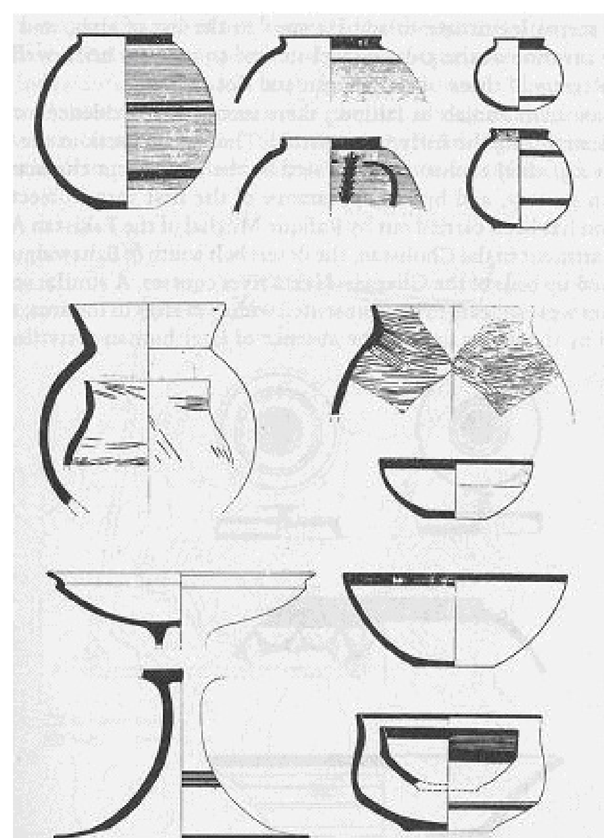
The ceramics can be classed with the Late Kot Diji assemblage found elsewhere, especially in Bannu (Tarakai Qila, Lewan) just to the north of the Gomal Plain. At Gumla this includes perforated ware,

akin to Urban Phase of Harappan type. A range of other artifacts that would be associated with Mature Harappan was also discovered in

!

Gumla IV. For example, Dani note the finding of an etched carnelian bead, a cubical stone weight, a faience button or seal, steatite-paste disk beads, toy cart frames with wheels, and triangular terracotta

with
of a



Sarai Khola II, Kot Diji pottery
(*after Halim*)

Sarai Khola II, Kot Diji pottery (after Halim)

cakes. A conch bangle and lapis lazuli provide some information on long distance contacts. Dani was pioneer in his thinking about this material. Even in the absence of radiocarbon dating he was willing to say that this essentially Kot Diji Phase assemblage had sufficient materials of the Urban Harappa.

Rehman Dheri: Rehman Dheri is a much larger site in the Gomal valley. This important site was discovered by A.H.Dani in the course of his

1970-71 exploration of the Gomal valley. The site is in 1971. Archaeology

about 20 kilometers northwest of Dera Ismail Khan.

Rehman Dheri was a large settlement and in aThere was also a small

splendid state of preservation, but Dani's work at

Gumla and Hathala did not allow him to undertakefield season in 1975.

excavation at the time of discovery. The excavation

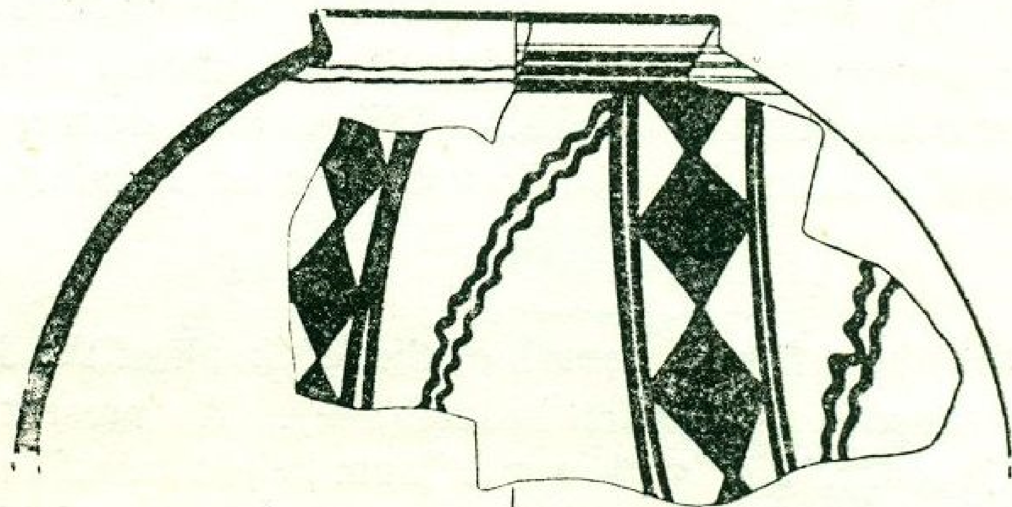
The material collected in 442 1963 indicated that it
had Kot Diji pottery. An

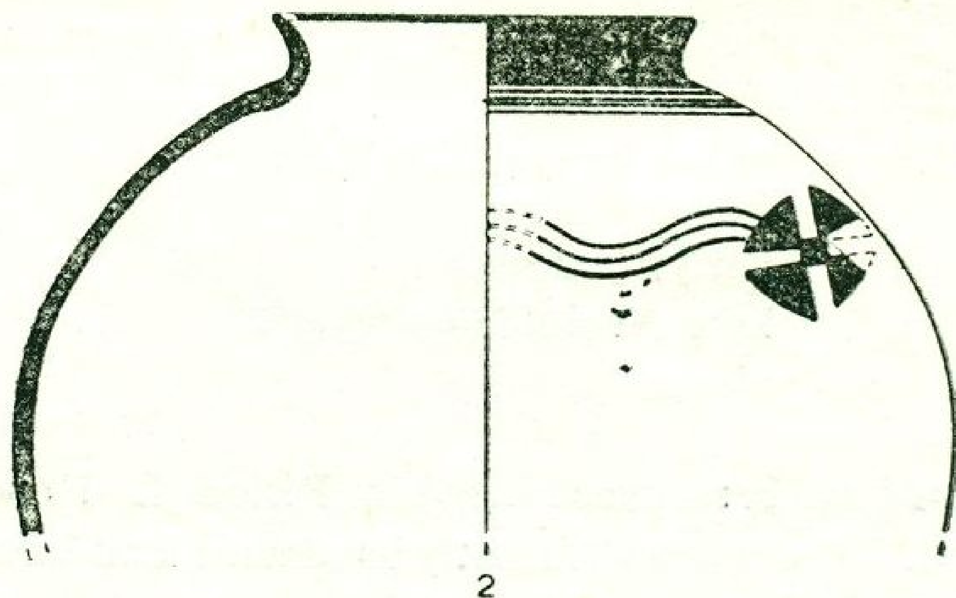
work was handled by his colleagues at Peshawar University who definitely did not do a good job (25). Dani was able to renew the excavation at Rehman Dheri in 1991 but the site was already messed up by the inexperienced students and their teachers.

The first two occupations of Rehman Dheri have been assigned to the Kot Diji Phase. Individual rooms were found for Period I, defined by walls formed from mud slabs. Based on ethnographic observations, these slabs or blocks were taken from dried up water courses and formed into house walls. This is an unusual form of construction, not noted elsewhere in the Greater Indus Region. Both grain silos and hearths were found in these rooms. The hearths were of two types: circular and rectilinear. A unique ivory pendent was found in Period I. The architecture of Period II shows signs of continuity out of Period I. The grain silos seems to disappear, to be replaced in function by large storage jars.

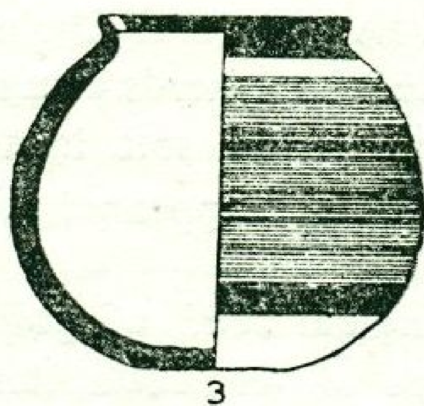
Rehman Dheri is basically a Kot Diji culture site, showing an increasing number of Kot Diji pottery forms and designs culminating in some Indus civilization examples. Otherwise, the site is fortified right from the beginning, with a 1.2 m wide mud and mud-brick wall resting on a 1.8 m wide foundation wall of the same material. Wheat, barley, fish and domesticated cattle, sheep and goat complement the subsistence picture. Two interesting features of the site are the occurrence of an ivory seal right at the beginning and the wide occurrence of graffiti engraved either on the bases or at the rims of pots from the middle phase onwards. Some of these graffiti characters remarkably resemble with the pictographic writing symbols of the Indus civilization. The calibrated date range of Rehman Dheri is *ca*. 3400 to 2100 BC.

The Pothowar Plateau: The only relevant excavation in this region is Sarai Khola whose Period I has ground stone celts, terracotta wheels and toy cart frames, microlithic tools, bone points, hand-made pottery with basketry-impressed base, and no metal. The transition period II was gradual, handmade pottery being replaced with wheel-made type. An example of this kind is a red jar with a short neck and a large elliptical body, and painted black at the neck and shoulder. This is a typical Kot Diji form, more of which has been found in this period, along with some copper, terracotta and shell bangles, microlithic and ground stone artifacts, terracotta cattle

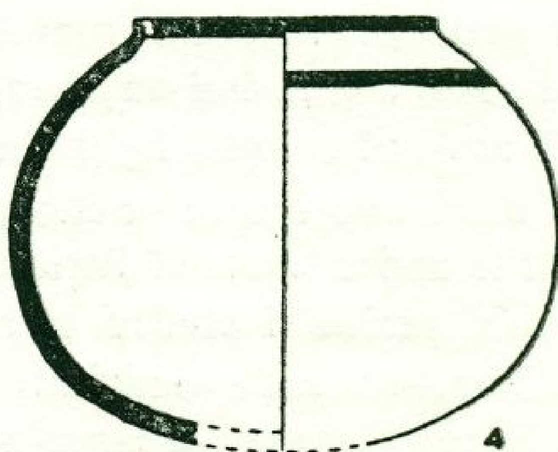




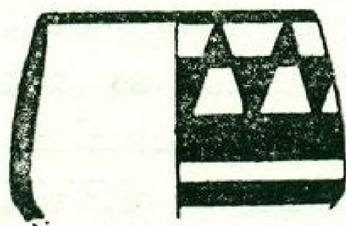
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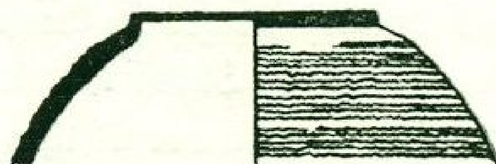
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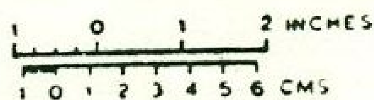
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5



6



Kot Dijian pottery from Jalilpur
Early Indus—III
Early Indus—III! !
A Prelude to Civilization
marvelous settlement, it appears to be a single occupation site, and belongs to Kot Diji Phase.

the Thal Desert. Although this area is near

etc. There is no radiocarbon date but Period II

It wasBannu, very little similarity in the artifactsEarly Indus—III ! has

nium BC.

discovered been bynoticed.It appears that the Jalilpur: Jalilpur is a small Punjabi village

Majumdar
in
with a large Early Harappan site. Located 75 kilo

Mianwali settlements are more 'Kot Dijian'

meters southwest of Harappa. The site covers an

than those in Bannu area. Apart from a

is on anM.R.Mughal of Pakistan Department of Archaeology

general survey and surface exploration, nooutcrop at the in 1971. There was also a small field season in

1975. The material collected in 1963 indicated that

archaeological work has yet been undertaken.southern-mostit had Kot Diji pottery. An early occupation turned There is no coherent report available either.

vated site of the Hakra Ware Phase, the importance
Kirthar Range, of Jalilpur lies in the understanding of the Early above theHarappan through Hakra Ware Phase. The transi
alluvial plain tion from Period I (Hakra Ware) to Period II (Kot Diji)
of

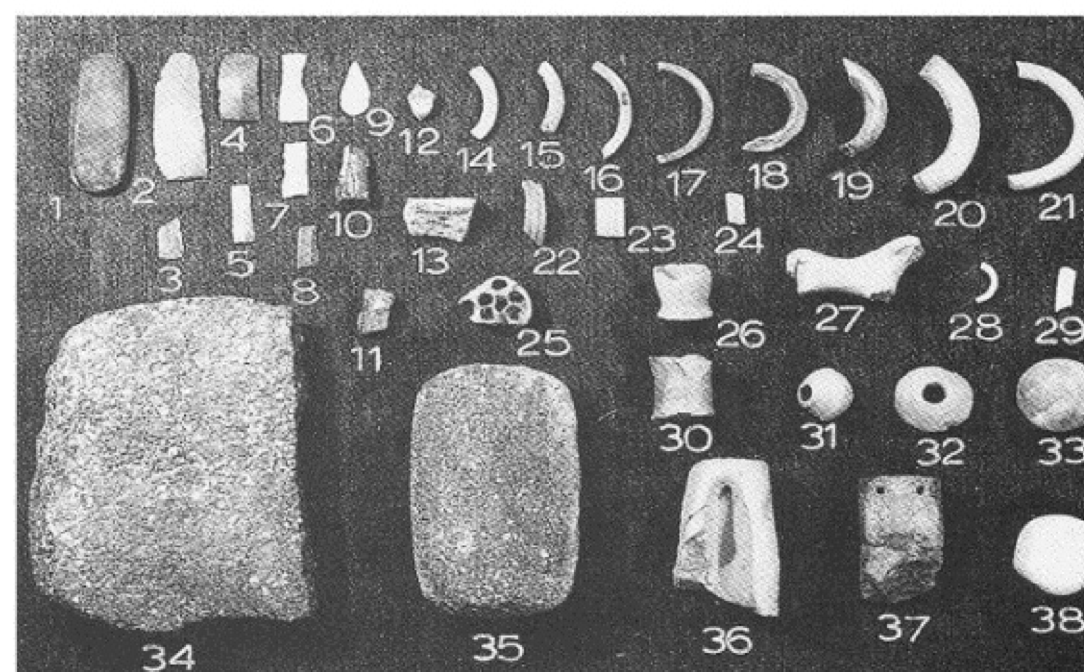
The Kulli Cultureat Jalilpur is not abrupt. There is a gradual change

the Baran of ceramic inventory. Two structures of mud brick
Ni a i ,
and mud lumps were recorded in Period II. The ma

This cultural complex is named after a site

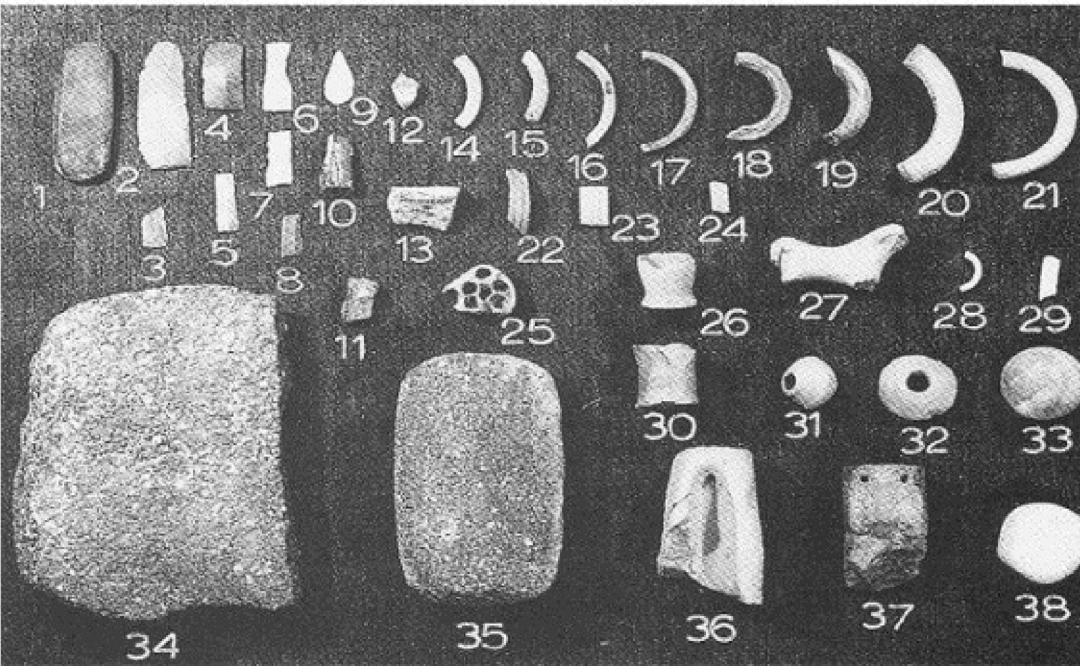
per en ni al terial inventory of Jalilpur II includes triangular ter

in Kolwa which was discovered by Aurel Stein. Since then, several other sites became



Stone, lapis lazuli, terracotts, and shell objects of the Early Indus period in Cholistan (*after Mughal*)

known from Makran to southern Kalat, to Nausharo in the Kachhi plain, and to the stream in this region. The



Stone, lapis lazuli, terracotts, and shell objects of the Early Indus period in Cholistan (*after Mughal*)

eastern foot of the Kirthar Range

settlement has two successive

in walls on one side, the inner wall southwestern Sindh. Some motifs and vessel being three to four meters high, shapes found in southeastern Iran and on themade of stone. The neighboring Arabian Peninsula, are sometimes also linked

stream in this region. The
settlement has

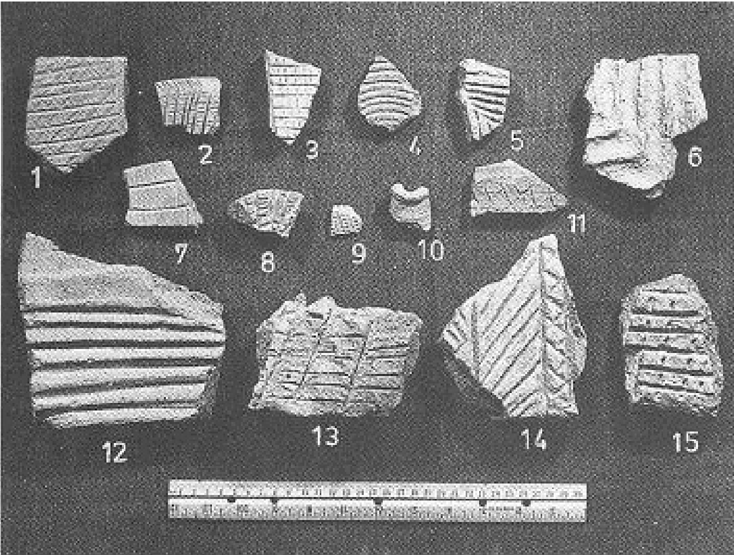
to the Kulli and seen as indications for long

two successive

distance contacts. These affinities are,walls on one side, the inner wall however, weak.being three to four meters high,

Early Harappan artifacts from Cholistan (*after Mughal***)** made of stone. The neighboring

During his tour of Gerdosia, the Greek name



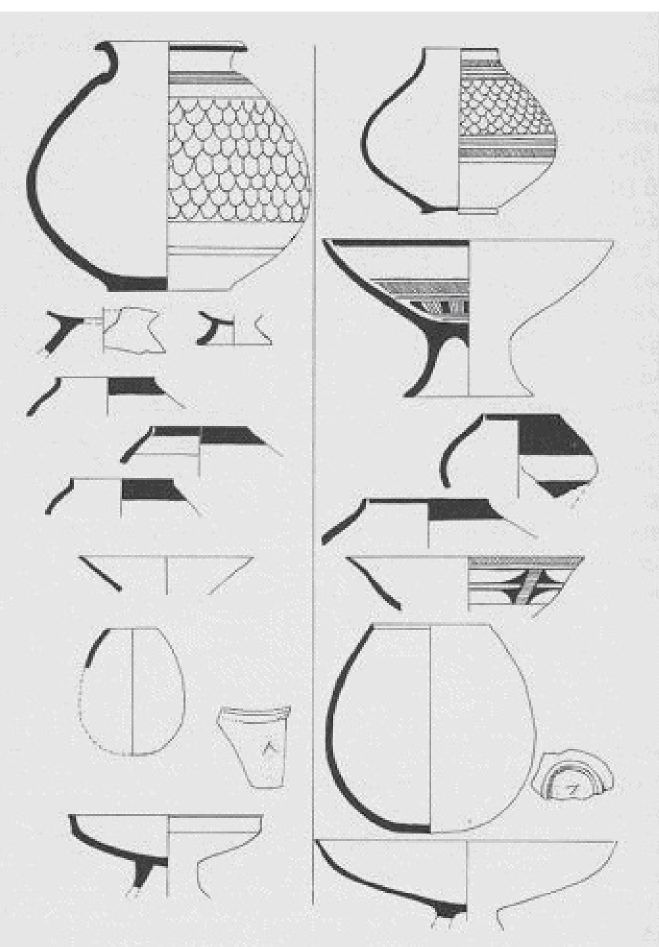
Early Indus artifacts from Cholistan
(*after Mughal*)

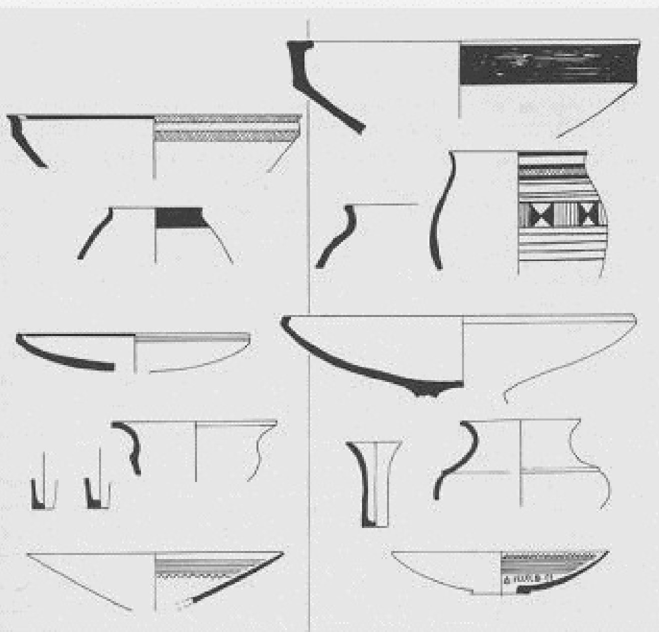
for southern Baluchistan and Makran, Stein

site of Phang, also on Baran Nai, is much

uncovered several prehistoric sites, some of

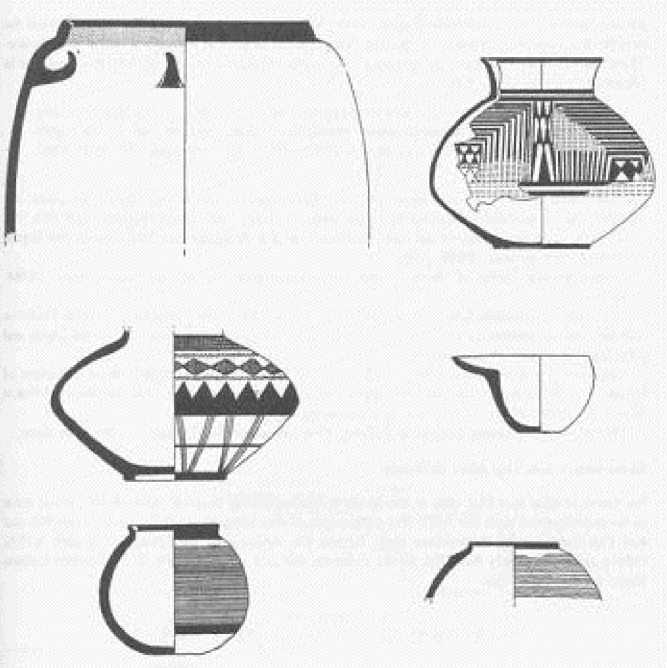
smaller and is associated with a gabarband. It
too is a purely Kot Diji site.





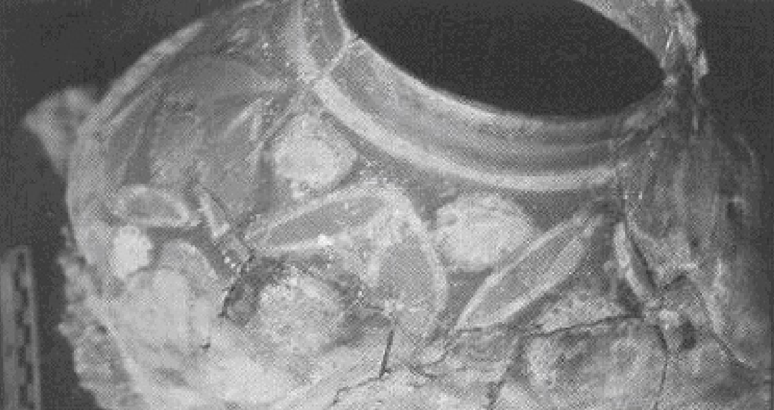
Comparative typology of pottery of pre-Harappan Kot Diji (left) and pre-Harappan Amri (right) (*after Fairservice*)

them he briefly excavated. Kargushki Damb,


Early Indus pottery in Cholistan
(*after Mughal*)

Comparative typology of pottery of Kot Diji (left) and Amir (right)

An interesting area of Kot Diji settlements is District Miasnwali, especially at the edge of



Hand-built pot with intersect-ing-circles motive, Harappa

(*after Fairservis*)

racotta cakes, toy cart frames, cart wheels, human figurines, bull figurines, bangles, beads of terracot

Kulli, Mehi, Nundara, Shahi Tump,

ta,agate and carnelian; pestles, and copper pieces.

Niai Buthi, Nindowari, and Sutgaken **The densest distribution of the**

Kot Diji phase sites is not in Sindh, where this

dor can be specifically mentioned in

phase was identified as marking the immediately

context of the material covered in this antecedent level of the Indus Civilization at the site

antecedent level of the Indus Civilization at the site

chapter. Many of these sites are located

odd sites share a slightly different but overlapping

in strategic positions, on top of mountains or terrace hills, overlooking the area of distribution with the sites of the Hakra Ware
(*after Mughal*) phase. According to Possehl, there are fifty-one Kot valleys and controlling the plains and passes . Other sites are small hamlets built Diji sites in Bhawalpur and the Desert of Cholistan.

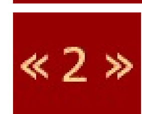
Page 307 443
Page 308

The preceding Hakra Ware Phase documented the presence of nomadic and semi-sedentary peoples, but by the Early Harappan this changed. Village farming communities predominate, and while site counts drop in this area, the presence of Kot Diji

occupations is strong and deep. Gaghar-Hakra river



gles and female figurines, a frequent blade industry,



would have flooded seasonally. The history of this rare polished celts, and beads of lapis lazuli, carnelbraided river system shows that it terminated in an inland delta in the Cholistan. Flooding would have renewed grasslands as well as fields. The apparent

| Ravi Phase Occupation |frequency of village farming communities should not

mask the fact that vast reaches of this environment would have been prime land for cattle keeping peo ples, living in symbiosis with agriculturists. No site

ian and steatite - has been traced at the northnorthwestern edge of the mound E at the site. Period II - massive mud-brick perimeter walls with a few structural phases, terracotta toys, animal figurines, bangles, tiles, etc. and a systematic lay-out of habitational areas along a major north-south street -

has been traced both in this section and along the
O
has been so far excavated.
n the northern part of Mound AB (Figure 1) excavations in 1996 were undertaken in both
southern edge of the mound. The Period II settleAt the site of Bhoot in Bhawalpur region, to ment covered more than 13 hectares.ment covered more than 13 hectares.
the northeast of Kot Diji, surface finds of the Kot The site of Harappa is one of the largest and Dijian ceramics have been made. Even further than
2600 BC) occupation levels. In 1998 - 2000 a much larger horizontal exposure was made of
most important cities of the Indus Valley Civilization.
both Ravi and Kot Diji levels. During the Ravi and Kot Diji Phases various aspects ofThis is perhaps the only site where an entire seacross the Indo-Pak border, of which Kalibangan
quence has been recovered that spans the history
settlement structure, specialized technologies, and socio-economic networks were developedhas been excavated by Lal and Thapar. This is anof Indus cities. Unlike the equally important site of
and became the foundation for later urban structure of the Harappa Phase (Kenoyer and
important site; it will be reviewed in the next chapMohenjo-daro to the south, where baked bricks Meadow 1999).
buildings provide an impressive vista of urban archi

Kot Dijian Harappa: About 70 km to the northeast of Jalilpur along the alignment of the Ravi is Harappa where the excavations have identified two periods of Kot Diji occupation. Period I - mudbrick walls, Kot Diji related pottery, terracotta ban

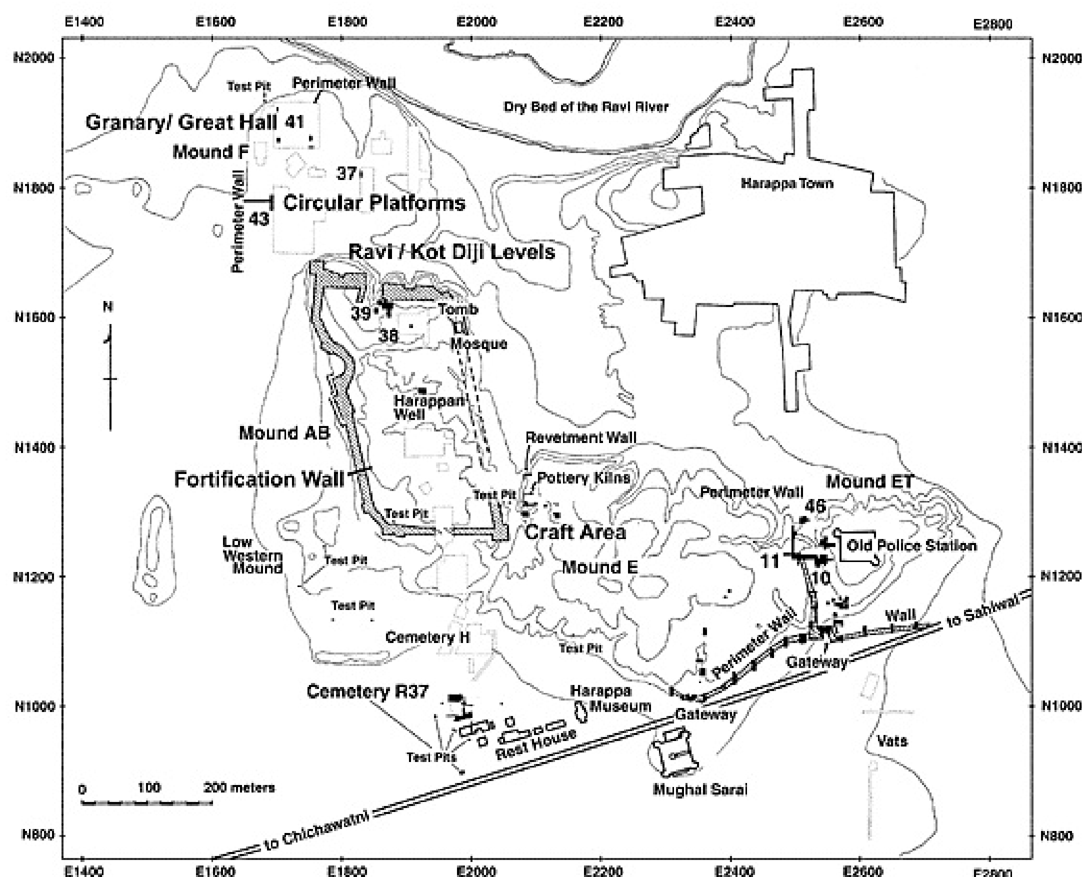


Figure 1: Harappa Excavation Areas: 2000

Harappa Excavation Areas: 2000 (Kenoyer, Meadow, Wright)

The Ravi Phase village was probably divided into two parts, with one part along the northern edge of what is now Mound AB and the other at the northwest corner of Mound E, the two separated by a low-lying area (Figure 1). The earliest architectural structures appear to have

been huts oriented north-south and east-west made of wooden posts with walls of plastered


Recent Discoveries and Highlights from Excavations at Harappa: 1998 - 2000 « 1 » A Prelude to Civilization

| R.H. Meadow and J.M. Kenoyer |

tecture, drains and wells, the ancient mounds of Harappa are characterized by imposing erosion

gullies, piles of brick rubble and fragmentary walls.| Introduction |

Excavations in the 1920s and 1930s exposed large
areas of the urban occupation and later excavations
by the Harappa Archaeological Research Project
The greater Indus Valley of Pakistan and western India was the setting for one of the world's
some raw materials from the east and north also.
have been able to build on these earlier studies to
earliest urban societies. Although the ancient script of this culture has not been deciphered,
No credible evidence has, however, been forthcom
define at least five major periods of development
archaeological research is gradually exposing the unique character of this society through
ing for this possible exchange with the east.
(Table above). These five periods represent a con
detailed studies of its cities and architecture, the organization of technology and trade, its

Craft production indicators from Kot Diji tinuous process of cultural development where new subsistence economy and a wide range of symbolic arts and ornaments. levels show a marked increase in technological aspects of culture are balanced with long term concomplexity and new types of finished objects. The tinuities and linkages in many crafts and artifactThe site of Harappa, Pakistan is one of the largest and most important cities of the Indusproduction of glazed steatite beads and seals as styles.The initial urban character of Harappa begins Valley Civilization. This is one of the only sites where an entire sequence has been recoveredwell as of faience ornaments resulted from the re

during the Kot Diji Phase, but it is in the following
that spans the history of Indus cities. Unlike the equally important site of Mohenjo-daro to the
finement of earlier glazed steatite manufacturing
Harappa Phase that the settlement became a major
south, where baked bricks buildings provide an impressive vista of urban architecture, drains
techniques. Precious metals such as copper and
urban center with links to other equally large cen
and wells, the ancient mounds of Harappa are characterized by imposing erosion gullies, piles
gold were also employed for both utilitarian and
ters, towns and rural settlements throughout the
of brick rubble and fragmentary walls. Excavations in the 1920s and 1930s exposed large
decorative purposes. Many additional styles of ban

greater Indus Valley. With the rise of the Indus cit
areas of the urban occupation, but found only more extensive evidence of the intensive brick
gles, beads, pottery and other utilitarian objects re
ies, technology and crafts appear to have become
robbing. The architecture and city planning of Harappa was similar to that of Mohenjo-daro
veal the need for increased variety for a more di
an essential mechanism for creating unique wealth
and the varieties of artifacts recovered from the excavations confirmed that these two sites
verse urban population (50).
objects to distinguish socio-economic classes and
represented the same cultural tradition which has come to be known as the Harappa Phase of
While some hand-built containers continued
reinforce the hierarchy of these classes in an urban
the Indus Valley Civilization. Recent excavations by the Harappa Archaeological Research
to be made during Period II, most pottery was made
context. on the wheel and carefullyProject have been able to build on these earlier studies to define at least five major periods
ofslipped,development (Table 1). These five periods represent a continuous process of cultural
The total area of the Kot Diji settlement at painted, or decorated with some sort of surface
development where new aspects of culture are balanced with long term continuities and linkages in many crafts and artifact styles.

Chronology of Harappa

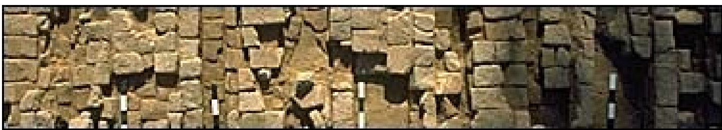
Table 1 Harappa Chronology

Harappa is more than 25 hectares and covers most of Mound AB, Mound E and parts of Mound ET. Early city planning is reflected in the layout of northsouth and east-west oriented streets and houses, and the use of mud-bricks of two sizes with 1:2:4 ratios to build houses, massive mudbrick platforms, and perimeter walls (47,48). In addition, the site was divided into two distinct mounds (AB and E) each

The Ravi or Hakra Phase represents the initial occupation of the site (**Period 1** : >3500 BC

modification. Red slip and black painted designs
with a massive mud-brick perimeter wall. During this 2800 BC). Over time, the economic and political importance of this small community resultedRavi period Harappa emerged as a major regional cen
in its growth and expansion during the Kot Diji (Early Harappan) Phase (**Period 2** : 2800BC Phase.
The motifs include horizontal bands, new

ter, integrating its hinterland as well as obtaining 2600 BC). Excavations of the early Ravi and Kot Diji levels from different parts of thestyles of geometric and floral motifs, as well as the materials from distant resource areas
(49)ancient city have focused on aspects of settlement organization, craft technologies,more
traditional pipal leaf, fish scale, and intersectThe wide variety of raw materials used in specialsubsistence activities and various forms of social and political organization. A special indicates a competitive expansion of trade networks and the increasing importance of exotic items. Most



of this trade was with the borderlands in the west but it is possible that the Early Harappan people,

especially those living in the Indus plains, acquired

Period
Period 1
Period 2
Period 3A Period 3B Period 3C Period 4
Period 5

Era Years
Ravi aspect of the Hakra Phase 3300 BC - c. 2800 BC Kot Diji (Early Harappa) Phase c. 2800 BC - c. 2600 BC Harappa Phase A c. 2600 BC - c. 2450 BC Harappa Phase B c. 2450 BC - c. 2200 BC Harappa Phase C 2200 BC - c. 1900 BC Harappa/Late Harappa Transitional c. 1900 BC - c. 1800 BC(?) Late Harappa Phase c. 1800 BC (?) - < 1300 BC

ized crafts during the Kot Diji Phase indicates the continued expansion of trade networks that were initiated during the earlier Ravi Phase (see below); in fact, The roots of such a long distance trade go back almost to the Early Settlements in Baluchistan. The early town at Harappa had trade connections with the chert quarries at the Rohri hills in the central Indus and shell collectors of the distant Makran coast, some 860 kilometers away. Various rocks and minerals were imported over distances of 300 to 1000 kilometers for the production of utilitarian objects such as grinding stones and chipped stone tools as well for the manufacture of ornaments such as beads and inlay. The use of similar raw materials from different resource areas, such as grey black chert from Baluchistan and tan chert from Sindh,

ing motifs that had their origins in the Ravi Phase.

The large collections of pottery from this area reveals a clear transition from the earlier Ravi pottery to what is commonly referred to as Kot Diji pottery. The later Kot Diji levels show a gradual transformation into what is commonly referred to as Harappa Phase pottery. When combined with the evidence of other artifact types, such as terracotta cakes, bangles, figurines and even architecture, it is possible to confirm that the Harappan culture emerged from the earlier Kot Diji culture and that it was not intro duced to this area from outside regions.

Of particular importance in this regard is the first appearance of the Early Indus script that has been found on pottery, a sealing of a square seal with possible Early Indus script, and a cubical limestone weight that conforms to the later Harappan weight category. In 2000 a fragment of an unfinished square steatite seal carved with an elephant motif was discovered which indicates that this unique type of seal was being made in addition to the more common geometric button seals (51). These discoveries suggest that the development of the Indus script, the use of inscribed seals and the standardization of weights occurred during the Kot Diji period, some 200 years earlier than previously thought. The emergence of writing, seals and standardized weights also implies the development of more complex social and political organizations that would have required these sophisticated tools and techniques of communication and administration.

These new developments of site organization and specialized crafts appear to be linked to the emergence of a more highly differentiated society during the Kot Diji Phase. Possible forms of social

elaboration include the development of hierarchies and occupational classes as well as the inclusion of new ethnic groups, including those not previously incorporated into the urban structure. Such groups may have comprised pastoralists, hunters, fishers, and those associated with many of the specialized crafts and long distance trade that became increasingly important during this period and the following Harappa Phase.

That the Kot Dijian variant of the Early Harappan occupancy of the Indus Valley is not a unique matter at Harappa is indicated by the finds of a comparable pottery from the pre-defense deposits found by Sir Mortimer Wheeler. The important fact is that the presence of this settlement so far into the Punjab strongly suggests that a rapid diffusion across the fertile Indus plain was in process *before* the Harappan period. Evidence for this phenomenon has been accumulating for some time.

Some Other Sites: We know nine Kot Diji sites in the Sindh Kohistan. Some have mixed AmriNal and Kot Diji ceramics on the surface. Others are more Kot Dijian, as for example, the pair of settlements at Phang and Kohtras Buthi on the Baran Nai. Kohtras Buthi is a marvelous settlement, it appears to be a single occupation site, and belongs to Kot Diji Phase. It was discovered by Majumdar in 1931. The site is on an outcrop at the southernmost extent of the Kirthar Range, above the alluvial plain of the Baran Niai, a perennialstream in this region. The settlement has two successive walls on one side, the inner wall being three to four meters high, made of stone. The neighboring site of Phang, also on Baran Nai, is much smaller and is associated with a gabarband. It too is a purely Kot Diji site.

An interesting area of Kot Diji settlements is District Mianwali, especially at the edge of the Thal Desert. Although this area is near Bannu, very little similarity in the artifacts has been noticed. It appears that the Mianwali settlements are more ’Kot Dijian’ than those in Bannu area. Apart from a general survey and surface exploration, no archaeological work has yet been undertaken. There is no coherent report available either.

RAVI PHASE AT HARAPPA

The Ravi Phase represents the initial occupation of the site of Harappa. Strictly speaking, it is not a distinct cultural phase but rather an extension of the Hakra phase described in Chapter VII.3. Over time, the economic and political importance of this small community resulted in its growth and expansion during the Kot Diji Phase (see above). Kenoyer, Meadow, and Wright are credited for describing this cultural phase at Harappa (52). In 1996 excavations were undertaken in both the Ravi Phase (3300-2800 BC) and the Kot Diji Phase (2800-2600 BC) occupation levels. In 1998 - 2000 a much larger horizontal exposure was made of both Ravi and Kot Diji levels. During the Ravi and Kot Diji Phases

T
various aspects of settlement structure, specialized

he earliest pottery at Harappa (Period 1A) are entirely hand-built shapes with a range of decoration from plain to polychrome (Figure 2). Some vessels have a coarse appliqutechnologies, and socio-economic networks were on the exterior made from clay and calcium carbonate nodules. Towards the end of the Ravi Phase (Period 1B), the potter's wheel began to be used, resulting in new and diverse vessel forms and rim shapes. Some of these forms became the basis for the pottery of the Kot Diji Phase.

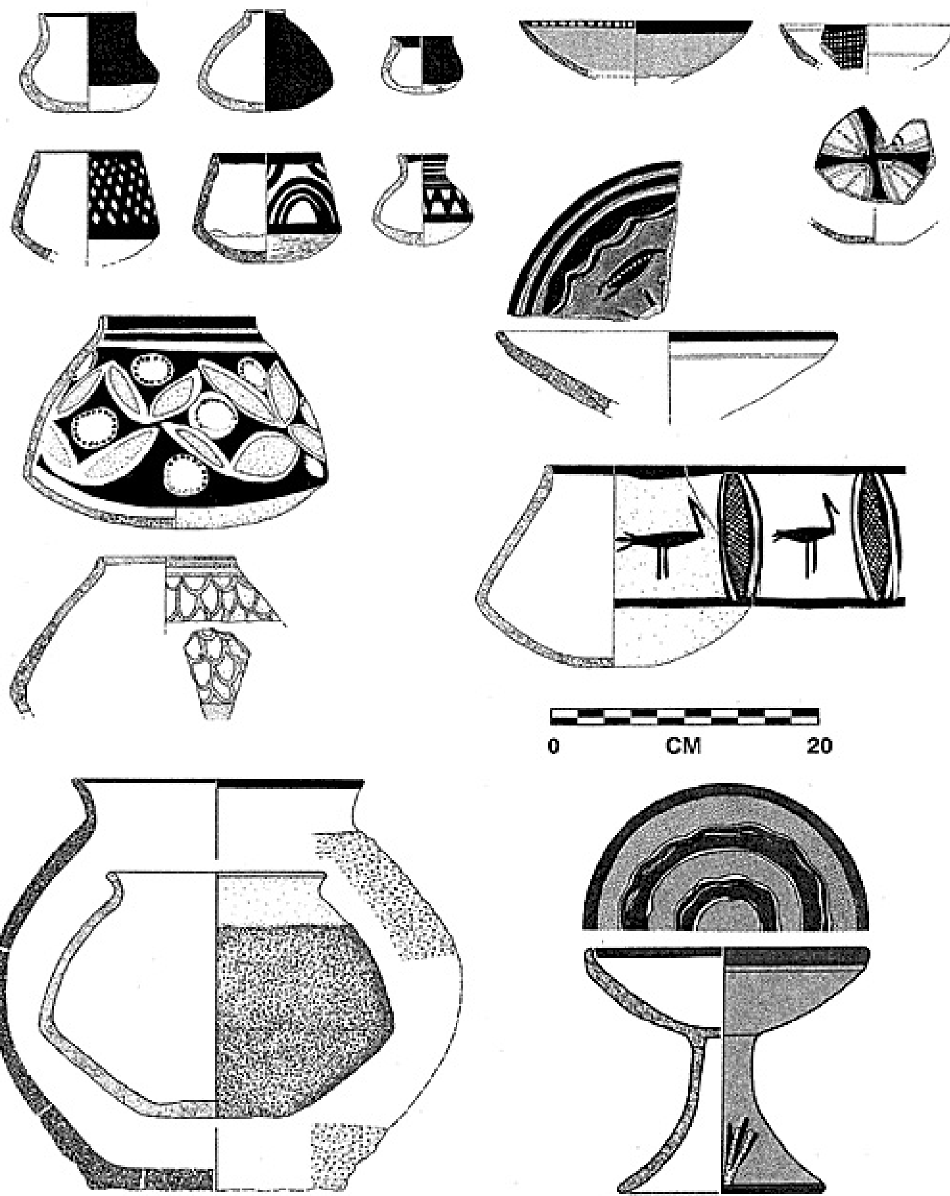


Figure 2. Ravi Phase Pottery

T

Ravi phase pottery

(Meadow/Kenya, www.Harappa.com)

he use of pre-firing "potter's marks" and post-firing "graffiti" on pottery also indicates that concepts of graphic expression using abstract symbols were emerging (Figure 3). Many of the marks and signs consisted of a single character or symbol, but one example has three linked trident or plant shapes. Many of marks and signs used during the Ravi Phase continued to be employed through the Kot Diji Phase, and on into the Harappa Phase, where some of them

can be identified as elements of the Indus writing system. The Ravi Phase village was probably divided into two parts, with one part along the northern edge of what is now Mound AB and the other at the northwest corner of Mound E, the two separated by a low-lying area (see map below). The earliest architectural structures appear to have been huts oriented north-south and east-west made of wooden posts with walls of plastered reeds. Some mud-brick fragments of what may be a kiln have been found, but no complete mud-brick architecture has been found to date.

The earliest pottery are entirely hand-built shapes with a range of decoration from plain to polychrome (Figure below). Some vessels have a coarse applique on the exterior made from clay and calcium carbonate nodules. Towards the end of the Ravi Phase, the potter's wheel began to be used, resulting in new and diverse vessel forms and rim shapes. Some of these forms became the basis for

the pottery of the Kot Diji Phase.

The use of pre-firing "potter's marks" and post-firing "graffiti" on pottery also indicates that concepts of graphic expression using abstract symbols were emerging (Figure 3). Many of the marks and signs consisted of a single character or symbol, but one example has three linked trident or plant shapes. Many of marks and signs used during the Ravi Phase continued to be employed through the Kot Diji Phase, and on into the Harappa Phase, where some of them can be identified as elements of the Indus writing system

THE KULLI CULTURE

This cultural complex is named after a site in Kolwa which was discovered by Aurel Stein. Since then, several other sites became known from Makran to southern Kalat, to Nausharo in the Kachhi plain, and to the eastern foot of the Kirthar Range in southwestern Sindh. Some motifs and vessel shapes found in southeastern Iran and on the Arabian Peninsula, are sometimes also linked to the Kulli and seen as indications for long-distance contacts. These affinities are, however, weak.

During his tour of Gerdosia, the Greek name for southern Baluchistan and Makran, Stein uncovered several prehistoric sites, some of them he briefly excavated. Kargushki Damb, Kulli, Mehi, Nundara, Shahi Tump, Niai Buthi, Nindowari, and Sutgaken-dor can be specifically mentioned in context of the material covered in this chapter. Many of these sites are located in strategic positions, on top of mountains or terrace hills, overlooking the valleys and controlling the plains and passes . Other sites are small hamlets built in the open plain. Although they have no defenses, they are of a very compact appearance. Most sites are associated with dams. The lay-out of some sites resemble the plan of Harappan sites: rows of houses built along lanes and streets,which are times, stairs provide Building materials were large ashlars or boulders, and the houses are often preserved to a considerable height.

There are quite a few characteristics of the Kulli Culture that apparently makes it contemporary to the Mature Indus Civilization, which followed the Early Harappan Phase and described in a separate volume of this series (Volume III: *Harappan Civilization - The Material Culture)*. Because of these simisometimes paved. Someaccess to upper terraces. larities, some archaeologists have described the Kulli Culture as a non-riverine manifestation of the Mature Harappan Civilization. However, the early part of this cultural phase certainly belongs to the Early Harappan Phase which this chapter is primarily concerned with. In the followings, we shall review this phase and see how this culture foreshadowed the Harappan Civilization which was to come.

Kulli culture is contemporary with Periods IV at Mundigak and with Damb Sadaat III in the Quetta Valley. It is the south Baluchistan’s end-product. It is thus the Early Harappan in its early phases and the Mature Harappan in its later manifestations. Whereas most sites further north were slowly abandoned with growing integration of the Indus Civilization the south was still inhabited. Some motifs and some shapes found in southeastern Iran and on the Arabian Peninsula, are often quoted as evidence for inter-regional contacts. The distribution of the Kulli sites makes it the largest cultural horizon in the mountains, but very little is known about the nature and development of this westerly neighbor of the Indus Civilization. Hab and Saruna valleys have recently been surveyed and quite a few Kulli sites have been found, many of them belonging to the Early Harappan period.

Kullicultureisnormallyassociatedwith Kolwa and the area around Las Bela. Bela lies in the Welpat tract, which is watered by the Porali River. It is an attractive area both for its rich agriculture and its

position on the route from the coast to Kalat. The Kolwa tract lies to the north-west of Bela and was known for its large quantities of grain, which were exported to its neighboring areas. The main site of Kolwa is Kulli which has given its name to a culture with a distinct pottery type associated with it. A second major site of this culture is Mehi which is in the Mushki valley to the north-west of Kolwa. As the third important site,Edith Shahr Complex can be mentioned. Only the upper levels were exposed both at Kulli and Mehi. The same is true for Edith Shahr Complex. Niai Buthi has only recently been excavated.

Stuart Piggott, following Stein's pioneering surveys, has done a lot of work on the Kulli culture and most of our understanding comes from him. In keeping with the early archaeologists and prehistorians of Europe, Piggott is also in perpetual search for the connections of Baluchistan with Mesopotamia or at least with Iran. He does find some vague relationship of Kulli pottery with that of eastern Persia but the evidence is very marginal. Similarly, like many of the early to minimize the influence of the Kulli culture in the western Sind which is quite perceptible, especially around the Manchar Lake. It is now widely agreed that the Kulli culture did cross the mountain barrier eastwards into the Indus plain, and that its connection with Iran is marginal at best.

Over most of the area of settlement in Baluchistan, Kulli ware is largely coincident with the Nundara and Nal wares of the Amri-Nal culture but it does not feel at home in the hills of Baluchistan.

to the region on which impinged a plain ware, as indicated above. We shall return In Search of Cultural Sequence to the Harappan cultural elements in South

Kulli culture is primarily defined by the form of its pottery and ornaments. It is, however, given further

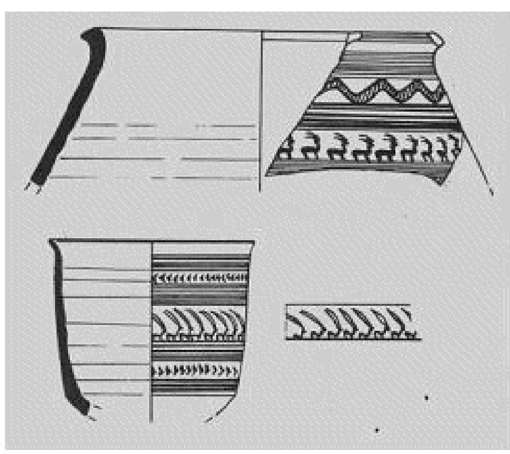
Baluchistan when dealing with this culture

definition and its independently status vis-à-vis the Amri-Nal culture by a difference of burial rite and the abundance of clay figurines of women and ani

mals on almost every site of the culture identified. *The Rise and Fall of Indus*

A point of intense discussion among various

archaeologists has been the extent of interaction between the Kulli phase and the Mature Harappan Civilization and their relative chronology. Harappan influence has been obvious during the Mature Harappan Civilization. What is not settled is whether



Pottery with animal figures from Kulli and Mehi (*after Stein*)

Kulli pottery with animals figures (after Stein)

the Kulli phase did contribute anything to the Harappan Civilization before it itself submerged into it. Most of the archaeologists tend to subscribe to the opinion of Piggott that the Kulli culture did not have much to do in the development of the Harappan Civilization and that the diffusion of culture and technology during the Harappan Civilization was only from the East to the West. Although no specific evidence can be offered to counter this general belief, it is hard to imagine that the Kulli culture did not contribute anything to the Harappan Civilization when every other Early Indus culture in one for or the other did. For example, at thesite of Mehi in the Mashkai, two strains can be observed in the pottery-making tradition, one representing by the normal painted wares of the Kulli phase and the other by plain wares and associated artifacts of types to be later fabricated at Mohenjo-daro and Harappa.

The discussion of the pottery from the Kulli settlements is complicated by the presence of varied traditions which cannot be separated straitigraphically. Majumdar asw the danger of considering the material from Mehi as necessarily of one period, and stylistic considerations suggest that there are at least two ceramic strains, representing an earlier painted ware local to the region on which impinged a plain ware, as indicated above. We shall return to the Harappan cultural elements in South Baluchistan when dealing with this culture and its far-flung settlements in a separate volume, *The Rise and Fall of Indus Civilization.* For the present we may notice that distinctive Harappan pottery appears at several locations in addition to an array of pots which represents a mix of the Kulli and the Harappan. The earlier pottery shows visible influence of Amri, Nal, and Quetta Valley.

A most interesting and attractive feature of the Kulli phase, and one which marks it off from the other regional groups we have studied in the preceding pages, is the frequent presence of baked clay figurines of women or of cattle. It must be confessed at the outset that we have no certain knowledge of the use or purpose of these little figurines. They can be regarded only as toys, or they can be assigned a role of votive offerings. Some European archaeologists have described them as regional deities on the pattern of later days Hinduism. The Kulli figurines are of clay, and the animals are painted, though not the women. The cattle figurines outnumber the women figurines. The female figurines, although less abundant than those of cattle, are widespread among the Kulli sites and are of great interest. They all terminate at the waist in a slightly splayed, flat-bottomed pedestal, and the arms are resting on the hips. Face is made carelessly by simply pinching the clay, transforming the figurine

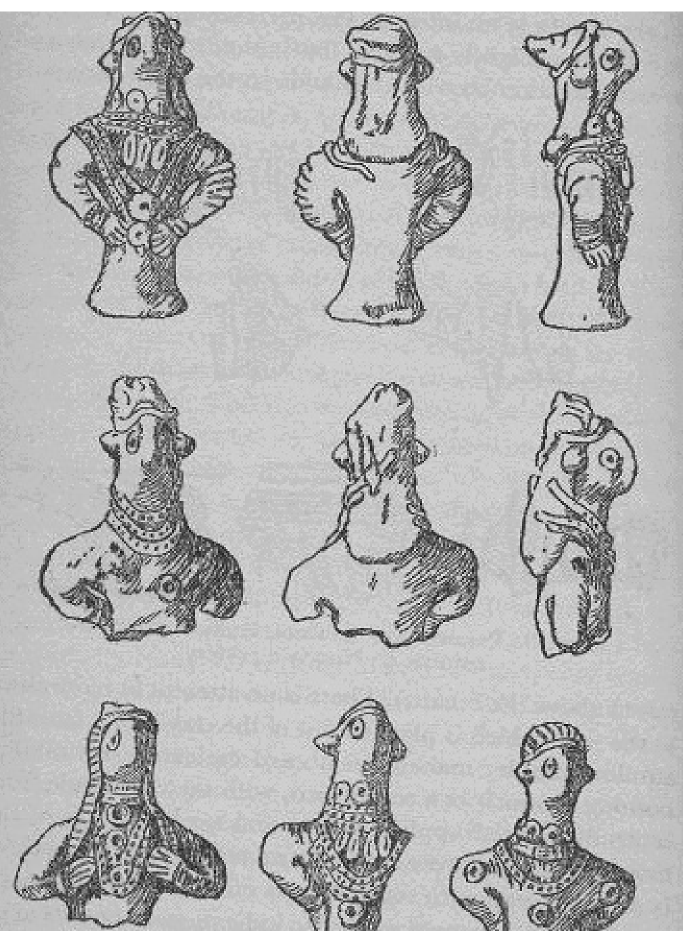
to an absurd caricature of a woman. All of the women's' figurine wear heavy ornaments, around the neck as well as in the ears. Bangles are also shown around the wrist. It would be interesting to compare these figurines with those of Harappa and wonder if a Kulli village girl has not wandered into a metropolis of the land!

Finally, there are few miscellaneous objects in the Kulli culture to be mentioned before discussing the individual sites. Stone saddle-querns and riders fro Kulli attest grain-growing, chert blades from Shahi-tump are comparable to those in the Amri-Nal culture and seem to be archaistic survivals. Beads including lapis-lazuli and agate were found at Kulli, and from this site also came an odd small pillar of polished purple-red and white variegated stone, 8 inch high and 4 inch in diameter at the base. From Mehi comes a cubical gray chert weight, of exactly the Harappa type. Clay bangles occurred at Mehi and Siah Damb. Some of the most important Kulli sites are described below:

Kulli: Kulli (12 ha), the largest mound in Kolwa, very probably represents the principal prehistoric settlement there. The surface collection illustrated by Stein is dominated by the exuberant black-on-red slip decorated pottery familiar in the cremation phase at Mehi. Included are female figurines and painted terracotta bulls, exactly as recovered at Mehi and Niai Buthi II levels. Surface clearance showed multi-room stone structures, the blocks of their shale being brought from about 3 km away. Some of these structures were probably used as storage rooms for grain. Within these structures or in the vicinity, Stein found fragments of copper, lapis lazuli beads, bone bangles, a grater, and grindng implements. The pottery included storage vessels decorated with raised wavy bands and black-on-red slip, and canister jars decorated with bug like animals identical to those of the latest phase at Mehi. There were two massive stone querns and their rubbing stones. Pottery is elaborately decorated and diverse in shape and color, but a characteristic feature is the presence of elongated animal forms with large and round eyes, shown in framed landscapes. Similar decorative motifs were

Early Indus—III **!**found at Nindowari as well.
Mehi: The site of Mehi (10 ha), located in Mushki Valley to the north- west of Kolwa and some forty miles to the light on the nature of the Kulli culture. On the surface, Stein found numerous fragments of both bull and human female clay figurines.

miscellaneous culture to be
Shahi-tump are
to be archaistic



Clay figurines from Kulli culture

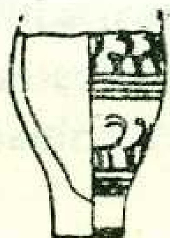
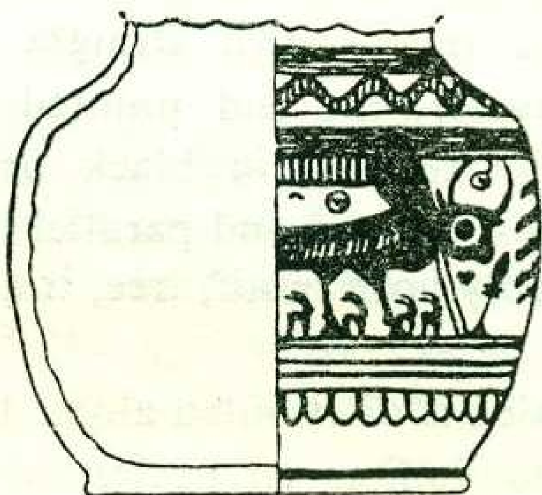
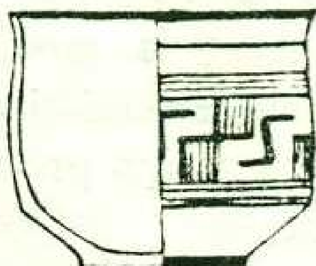
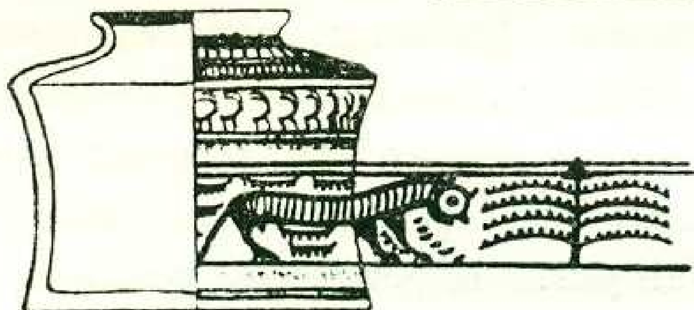
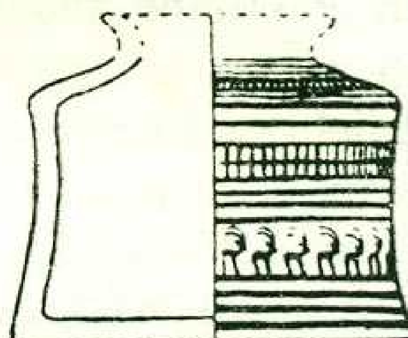
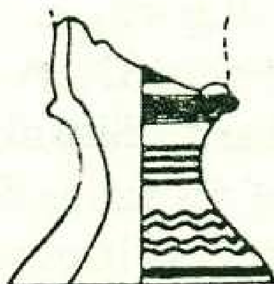
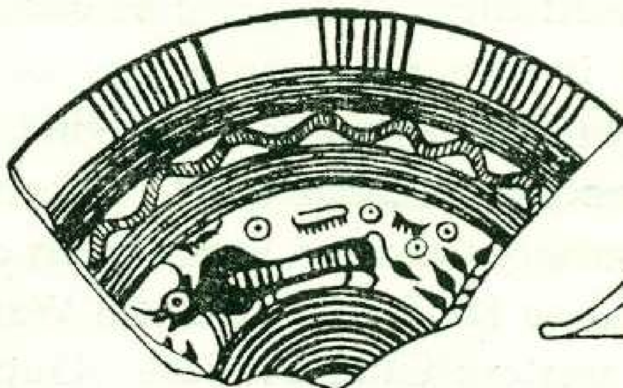
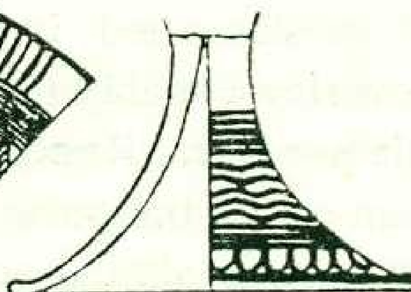
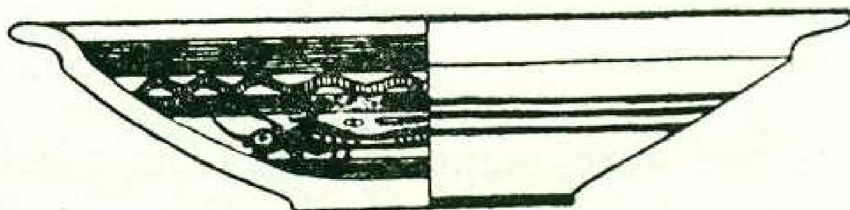
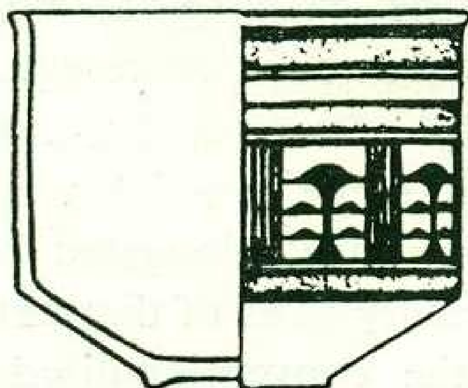
lapis-lazuli The area explored by Stein turned out to be a cemetery in which cremated remains were sometimes buried in vessels or sometimes in the ground. Intimately associated with these burials were copper tools, beads, and terracotta figurines representing women, bulls, and birds.

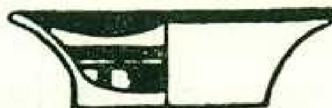
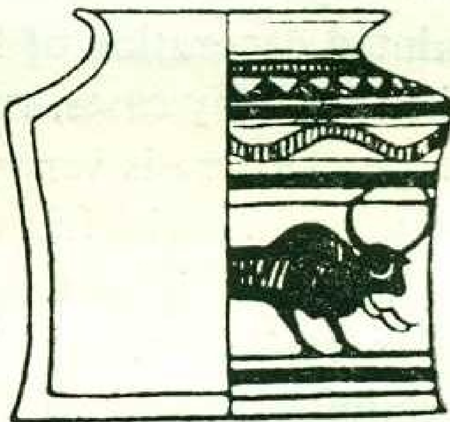
It is of comparative interest that the incinerary Kulli (12 ha), the largest mound in Kolwa, very probably represents theurns illustrated by Stein are of the plainer variety. Some were directly comparable in form and decoration to those found at Periano Ghundai. The female figurines of Mehi are clearly analogous to those of the Zhob cult. The goggled eyes, necklaces, shoul

figurines and painted terracotta

der form, pedestal bases, hanging hair, and hoods obviously represent the same basic composition. The bull figurines are generally somewhat cruder than those of the Zhob cult, but have parallel in Damb Sadaat III in the Quetta Ware. Parallels to the bird figurines are also found in the Quetta Valley.

A very important group of vessels carved out of soft stone comes from Mehi, and, as we have mentioned above, has been offered an evidence of an intimate connection between South Baluchistan and Mesopotamia of the time. There are several types of vessel represented. The more elaborate pots are decorated with fine engraved patterns

of chevrons and triangles. Pots similar these from Mehi appear in the sites near Bampur and in Siestan. A fragment of such a stone vessel has also been found at the lower level of Mohenjodaro. The connection of eastern Iran with southern Baluchistan has been demonstrated in the earlier times as well. This Kulli connection is apparently a strong link of this chain of continuous, but sometimes sporadic,relationship with the west.

Information about burial rites in the Kulli culture is rather scanty. A flexed inhumation burial was found at Kulli, there were no grave-goods and consequently its association with the culture is unproven. At Mehi, however, Stein cut a trench through a cremation cemetery. Here minor variations of the cremation rite were observed: in some burials the cremated bones were in pots; in others deposited directly in the soil; while in one, six children's skulls had been placed over a single cremated adult. Pottery, clay figurines and copper objects comprised the grave-goods, the latter being particularly rich in copper and bronze objects. The most outstanding find is the copper mirror, 5 inches in diameter, with the handle representing a stylized female figure in the manner of the clay figurines, with breasts and conventionalized arms on the hips, with the face provided by the reflection of the user of the mirror (see attached figure). This amusing trick and the sophistication of the metal-working technology make the Kulli culture stand out among the regional cultures of the time. In the Mehi cemetery were also found two copper pins, one with a flat, disc- shaped head and the other a head made of a small lapis-lazuli bead. Frangments of simple copper bracelets and of a small bowl were also found at Mehi.

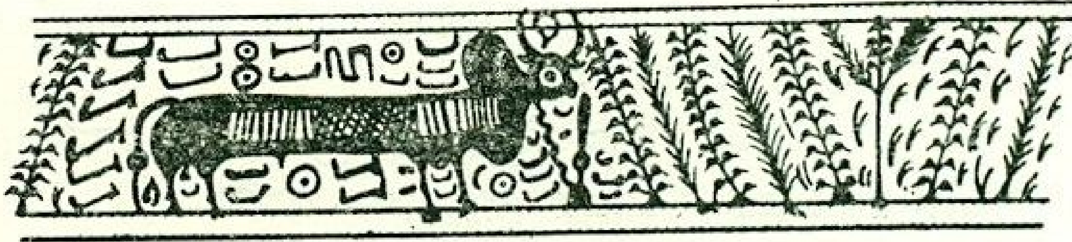
Niai Buthi: The most important site discovered by Stein is Niai Buthi about three miles to the northeast of Bela. It is set in the midst of the cultivation, and, in fact, both its eastern and its western slopes have been cut away by cultivators. The faces along these sides exhibit sections that in some cases run up to 20 feet in height. Stone and brick walls are exposed throughout these faces. Two main periods of habitation have been identified. The pottery in both periods is wheel- made and tends toward thickness in construction. The painted wares are generally of the Kulli type and can be divided into three main groups: (1) black- on-buff; (2) polychrome painted vessels in which red bands and black designs divided by simple lines alternate; (3) black-on-red slip design that include pipal leaf motifs in the Harappan style, as well as animal and geometric elements common to Baluchistan. The German-Italian team recently undertook an extensive survey of Las Bela and recovered quite a few interesting artifacts and pottery pieces, some of which definitely belong to the Kulli culture.

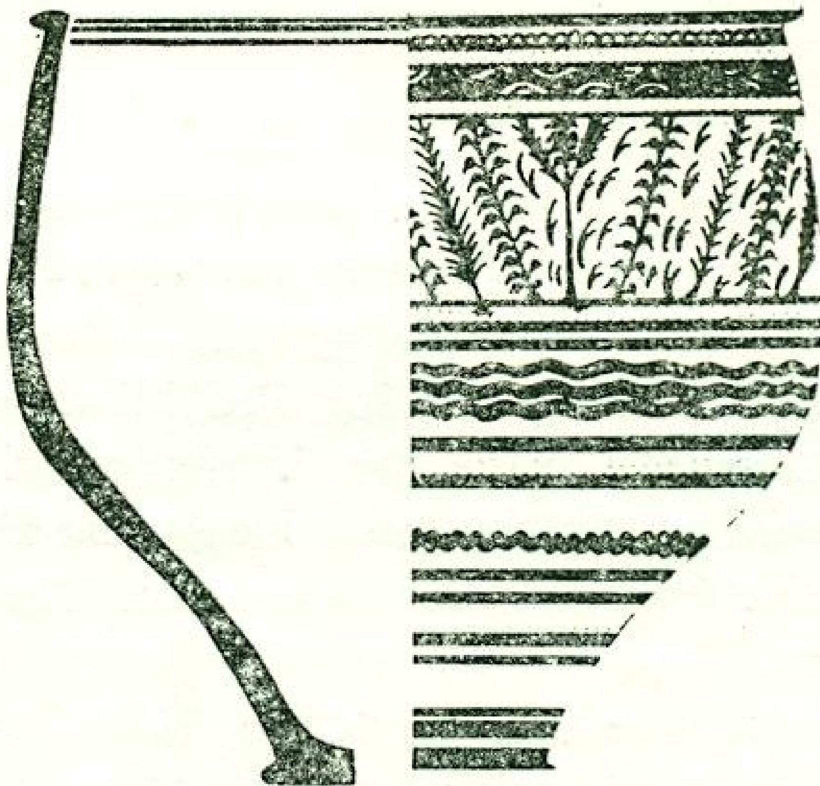
Nindowari: At Nindowari (4.5 ha), there is a central, stepped structuralcomplex, its stone-blocks weighing up to one ton. Associated with this is an assemblage of typical Kulli pottery, terracotta, mother-goddess figurines with appliqué decorations, painted bull figurines and two Indus seals. The calibrated date is mid-third millennium BC.

The Edith Shahr Complex: Fairservis excavated several sites in the northern extremity of Welpat. The discoveries there throw considerable light on the earlier Early Harappan period associated with Kulli as well as Nal cultures. The archaeological resources of this eight-mile stretch of valley are such as to make it one of the most important areas of Indo-Iranian cultural borderland in ancient Pakistan. Within the area there are at least five structures of one kind or another, clustered into groups and strung out along the valley. Almost all of these structures are of stone construction and are therefore remarkably preserved. Many have walls standing above four feet, and the ground plan for a great

number of buildings is readily traced. In most cases it seems apparent that the stone construction was to support walls of brick or wood that have long since disappeared. Fairservis divided these groups of settlements into two: Complex A of Kulli culture affinity, generally contemporaneous with NIA Buthi II, and Complex B which is of later times, of Mature Harappan period.

Edith Shahr shows a matrix of large river boulders set in mud and smaller stones. There is a series of stepped platforms and typical Kulli pottery and mother- goddess figurines. Edith Shahr has been associated with the upper phase of Niai Buthi. It may be noted that Las Bela has a known source of copper and it will not be surprising if the sites mentioned here are reflective of the wealth by mining and metallurgy in the Indus civilization period.





Kulli pottery from Nindowari

The Edith Shahr situation is strikingly illustrative of nucleated villages andindeed town life. The bulk of the nucleated village sites, with their significant monumental and formal structures, are located in the most unproductive part of the Welpat area. The ordinary village sites, on the other hand, are located in the midst of the rich cultivated plain to the south, The Edith Shahr sites are large and are evidence for sizable populations clustered around monumental buildings whose function was most probably ceremonial. Obviously, the presence of these “township” sites close to but not within the

most productive part of Las Bela speaks for a symbiotic relationship with the villages. In its simplest sense this might mean food for ceremony or shamanic magic. How much control was held by the inhabitants of the formal sites over the villages of the cultivated plain is, of course, uncertain, but the

diverse in shape and color, but a characteristic feature is the presence of **A Prelude to Civilization** **fact that both seemed to flourish is indicative of aelongated animal forms with large and**
continually successful relationship, whatever it was.la

tlements are also found outside Las Bela in Wadh,

round eyes, ***Coastal Plain of Somiani Bay:*** **in framed Kulli-type set shown**
ndscapes. **Similar** **motifsOrnach, and Drakalo, to the north, and in Kolwa, todecorative**

the west. The use of stone for monumental struc

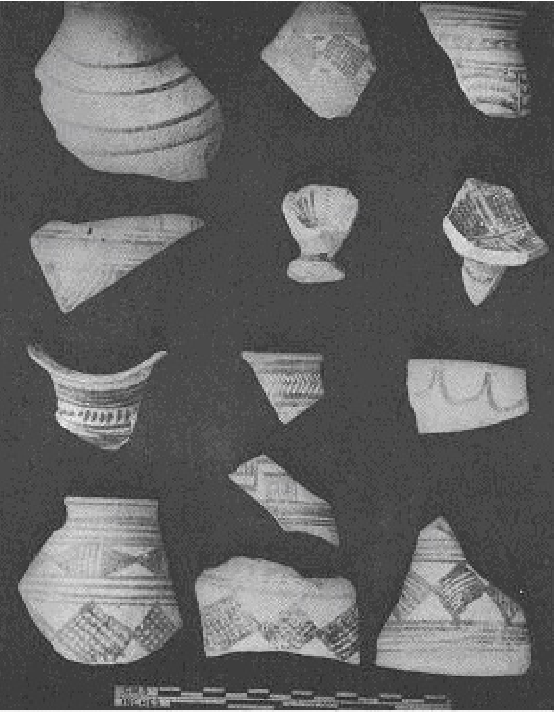
were found at Nindowari as well.

tures characterizes these remains. Typically there is a central mound and around it traces of a massive

Mehi: enclosure wall. A tendency to centralized settlementThe site of Mehi (10 ha),

and a diminution in number of villages in a limited

area such as the Ormach is evidenced by sites **located in Mushki Valley to the northwest of Kolwa and some forty miles to**



Pottery usually associated with early Kulli levels in southern Baluchistan. These samples are from Edith Shar complex, Las Bela

of

not much use was made of the available marine sources of food. The grains include six-row barley, vetch, legume and *ber*. The calibrated date-bracket is between the late fifth millennium and early third millennium BC.

CONCLUSION

Kot Diji and Kulli cultural phases are of immense significance in the prehistory of Pakistan. The Kot Diji phase is important because it represents the riverine culture of the Indus Valley and is generally thought of as the precursor of the Indus Civilization which was to rise in the same geographical area where the Kot Diji phase had been prominent. Its importance lies in another way also; it was the most expansive cultural phase that the Early Indus period has ever experienced. The extraordinary large geographical area that fell under the Kot Diji phase or its variants provided a degree of cohesion to the

Indus Civilization that followed.

the southwest of Nal, casts some further

bridging the gap between the upland Baluch cul

light on the nature of the Kulli culture. On

tures and the plains' evolving traditions. It provided this connecting bridge in two ways. First, it brought

the surface, Stein found numerous fragments

the results of the past cultural developments of

both bull and human Baluchistan to bear upon the riverine culture that clay was evolving in the plains of Sind and Punjab in thefemale

Pottery usually associated with the easrly Kulli leverls in dsouthern Baluchistan. These samples are from Edith

Shahr complex in Las Bela It
figurines. The area explored by Stein turned

eventually led to the blooming of the Indus Civiliza

out to be a cemetery in which cremated

regions on chronological basis because of its exis

remains were sometimes buried in vessels or
sometimes

the Mature Harappan Civilization. This connection

in the ground. Intimatelyin time and space probably gave a still yet undeter

mined impetus to the synthesis of a common culture

associated with these burials were copper

throughout Pakistan.

tools,
beads, and

The two cultural phases covered in this chap

terracotta figurines

ter were quite different from each other in their

representing women, bulls, and birds.scope and nature. They, however, did not exist in

vacuum. The Kulli culture intimately interacted with the contemporary Amri-Nal culture as well as that of

is of comparative interest thethe Helmand interaction zone, which we have desthat

ignated in the previous chapter as Damb Sadaat throughout the region. Bala Kot (2.8 ha) is the pri

incinerary urns illustrated by Stein are of the

phase and its Zhob-Loralai variations. Similarly, the

mary site so far excavated. It lies in the Khurkera plainer variety. Some Kulli culture interacted with the Kot Diji culture and directly

alluvium plain at the mouth of the Winder River fal

its several variations. These interactions between were comparable in form and decoration to those

ling into the Somiani Bay. Of the two periods of the site, the upper (Period II) belongs to Indus Civilization whereas the lower one or Period I constitutes a separate culture, named Balakotian. It is closely related to the Kulli with some elements of the Nal.
We find mud-brick houses whose orientation is dif ferent from that of the Period II houses. Wheel made painted pottery, some related to Nal poly chrome style, right from the beginning of occupa tion, has been found. Humped bull figurines, like those of the Kulli, microlithic tools, beads of lapis lazuli, and some copper complete the other cultural details. Cattle, sheep, goat, buffalo, pig, hare and deer of several varieties have been identified but
Page 314ning through various regions, we observe a common ethos spreading, and we cannot help but notice a synthesis of several regional cultures, past and present, developing throughout Pakistan. This process of integration would continue unabated till we see the Indus Civilization rising on the horizon.

The Kulli culture, and more so the Kot Diji phase, were capable of creating a ’surplus’ which is an essential component for the development of specialization, the division of labor, trade and com

quite intense. As a result, the regionalism that was

the hallmark of the mature village farming communities in Baluchistan, lost its sting. During the Early Indus period, we vividly see a common thread runmerce, and urban lifestyle. Kot Diji phase must have been especially proficient in this respect because of the availability of the fertile alluvial land and river waters for irrigation. The Kulli culture must have been an equal contributor to this economic condition for almost the same reasons.

Finally, the Early Indus period of the Kot Diji and the Kulli are significant for cooling off its past cultural relationships with Iran and Central Asia and starting off on a development path that was by and large local. The trade and exchange communication with the outside world in the west continued but there was less and less reliance on the importation of technology and cultural traits. In fact, it appears that this period started to be an exporter of culture and technology to the outside world.

Another characteristics of this time period has been a continued geographical expansion that had started in the Kechi Beg or even Togau phases preceding the Early Indus period. Archaeological evidence is available to show that the Indus man colonized a part of Gujrat and the border-lying areas adjacent to Punjab and Cholistan. However, beyond this physical expansion, the Kot Diji phase failed to influence the bulk of the present-day India in any meaningful way. Agricultural economy there remained allusive, sedentary lifestyle remained unknown, and the people continued living as nomads or at best in semi-permanent seasonal pastoral camps. This lack of projection to the east was in glaring contradiction with the intimate relationship with the west and the northwest. It is, however, not surprising. The geographical impediments between the Kot Dijian people and the inhabitants of neighboring India were insurmountable, thus foreclosing any effective interaction between the two peoples. This was over and above the starkly different cultural backgrounds of the two regions, the differences having been started as early as the Middle Stone Age and fortified throughout the Mesolithic transition and finally bifurcating the two paths of development in the Neolithic period.

During the Kulli and Kot Dijian phases, discussed here, we clearly observe some of the salient features of the Indus Civilization developing in the length and breadth of Pakistan. For example, we see the defense walls around some Kot Dijian settlements, we see the evolution of drainage system in a few Kulli villages, we see the continuation of building the grain storage facilities, we see a lot of similarities in the practices of building houses, and, of course, we see the continuously developing pottery forms, style, and paintings which intrude into the time of the Indus Civilization. We see the art of making human female figurines which became the fashion of the day in the Indus Civilization. Finally, the craft foundations, which were firmly laid down in this period, provided the base for the craft traditions of the Indus Civilization that was to come.

foregoing
pages of this volume. The interaction with the eastern borderlands
plains of northern India beyond the Indus-Ganges divide, which formed the was not that intimate but it existed. Here too, quite a bit of archaeological
north-eastern borders of ancient Pakistan, as defined here. At least, that was the A Prelude to Civilization
evidence is available to show a relationship between Gujrat and Sind, and
situation during the time period covered in this book, i.e. from the appearance of between Haryana and Punjab. Beyond the Aravalli, that is, the central andman to the beginning of the second millennium BC.

VI.7. The Borderlands

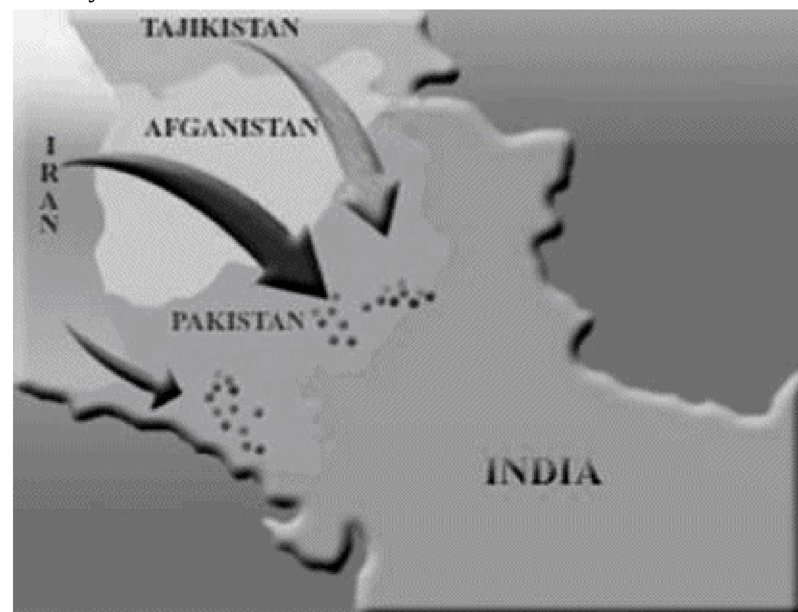
peninsular India, lived some nomadic hunters-gatherers, the existence of which
In the followings, we shall examine these cultural interactions and analyze the the Indus man probably had no knowledge of. The same applies to the Ganges
relevant archaeological data available to us. Where no or little interaction with
plains of northern India beyond the Indus-Ganges divide, which formed the
the borderlands is indicated, it would still be interesting to see as to what sort of
north-eastern borders of ancient Pakistan, as defined here. At least, that was the
developments were taking place in those regions. Wherever possible, some situation during the time period covered in this book, i.e. from the appearance of

VII.7. The Borderlands

man to the beginning of the second millennium BC.
comparisons would be definitely kind of culture did they represent at the time? How instructive did they influence the cultural and technological
In the followings, we shall examine these cultural interactions and analyze thedevelopments in ancient Pakistan and how the latrelevant archaeological data available to us. Where no or little interaction with
ter influenced the cultural developments beyond its own borders? Some aspects of these questions,

the borderlands is indicated, it would still be interesting to see as to what sort of The Western Borderlands especially those that pertains to the beginning of

developments were taking place in those regions. Wherever possible, some agriculture and settled life, have already been dis



cussed in the previous pages; here we shall concomparisons wouldA continued and sustained interaction centrate on the time period that we identify as the



The material so far presented outlines the
be definitely
between ancient Pakistan andIndus Valley and what kind of culture did they repthe
instructive resent at the time? How did they influence the culwestern borderlands,
During the time period covered in this vol
especially the ancientume, there were settlements along a narrow strip ofdevelopments
Pakistan and how the latter influenced the cultural
present-day Afghanistan and the arealand that constituted a major world route: the route
developments beyond its own borders? Some as
north
from Kandhar via Chaman and the Khojak Pass to
the
of
it,
Quetta been alluded hasvalley andpects of these questions, especially those that perto atcontinuing
southeastward tains to the beginning of agriculture and settled life,
through the Bolan Pass to descend on the Kachhi plain on the frontier between have already been
discussed in the previous pages;and
Sindh.
Kandhar
was
A continued and sustained interaction
Baluchistan
withhere we shall concentrate on the time period that Indus man's journey from the earliest
settlements to
Page 324
connected Shahr-ewe identify as the Early Harappan.
well-developed agricultural villages and then to an
between ancient Pakistan andSokhta in Siestan on one hand and Central Asia,the
During the time period covered in this vol
Early Harappan phase that was to be a harbinger of particularly Tukmenia, on the other hand. Shahr-ea full-blown
urban civilization, commonly known as
western borderlands,ume, there were settlements along a narrow strip of Sokhta, Kandhar, Quetta

valley, and the Lachi plain land that constituted a major world route: the route
the Indus or the Harappan Civilization. We surveyedpresent-day Afghanistan and the areathus formed
a coherent cultural sphere that had its his subsistence economy through the millennia and from Kandhar via
Chaman and the Khojak Pass to
noticed it change from food gathering to food pronorth the ofconnection with Turkmenia to the north and with the
Quetta hasvalleybeen alluded continuing southeastward
Indus plains to the southeast. In the beginning of to at
through the Bolan Pass to descend on the Kachhi

this Section we clearly saw the emergence of very plain on the frontier between Baluchistan and Sindh.
early settlements along this route, especially the

Kandhar
was connected undoubtedly evolved which eventually lead to longwith Shahr-etrack which lies within the boundaries of
Pakistan.
Sokhta in Siestan on one hand and Central Asia,
We saw these primary settlements expand and mul
particularly Tukmenia, on the other hand. Shahr-e
tiply. We also observed an intimate cultural ex
Sokhta, Kandhar, Quetta valley, and the Lachi plain
change all the way from the banks of the Oxus to
ducing. We also observed the development of pottery and other arts and crafts. A system of exchange
The material so far presented outlines the Indus man's journey from the earliest settlements to distance
trade.well-developed agricultural villages and then to an
All these developments, of course, did not
Early Harappan phase that was to be a harbinger of
happen in vacuum. When the Indus people were
a full-blown urban civilization, commonly known as
learning to domesticate plants and
the Indus or the Harappan Civiliza
animals in the hills and valleys of
tion. We surveyed his subsistence
Baluchistan, the peoples living in
economy through the millennia and
the borderlands, especially to its
noticed it change from food gather
West, were also adapting to their
ing to food producing. We also ob
own environments. The Indus served the development of pottery
man was bound to interact with
and other arts and crafts. A system
of
them;
with someundoubtedlyintimately and
exchange evolved
which

with others only marginally. Simi
eventually lead to long
distance trade.larly, while the inhabitants of some
borderlands were culturally walk
Allthesedevelopments,of
ing in tandem with the inhabitants
course, did not happen in vacuum.
of
Pakistan,
the
inhabitants
When the Indus people were learnof
Turkmenia Elburz
Zagros Hindu Kush
some other regions took a devel
ing to domesticate plants and ani
opmental route that was entirely
mals in the hills and valleys of Balu



Iran that of the Indus different from chistan, the peoples living in the
people. This chapter outlines the
borderlands, especially to its West,
world within which the Indus peo
were also adapting to their own en
ple flourished. Who were the peo
vironments. The
ples inhabiting Indus man was the
area
around
bound to interact with them; with
the Greater Indus Valley and what

some intimately and with others only
marginally. Similarly, while the in
habitants of some borderlands were culturally walking in tandem with the inhabitants of Pakistan, the inhabitants of some other regions took a developmental route that was entirely different from that of the Indus people. This chapter outlines the world

Map of Iranian Plateau
Map of Iranian Plateau
Afghanistan
Pakistan

thus formed a coherent cultural sphere that had its connection with Turkmenia to the north and with the Indus plains to the southeast. In the beginning of this Section we clearly saw the emergence of very early settlements along this route, especially the

track which lies within the boundaries of Pakistan.
those of the Indus throughout this developmental period.

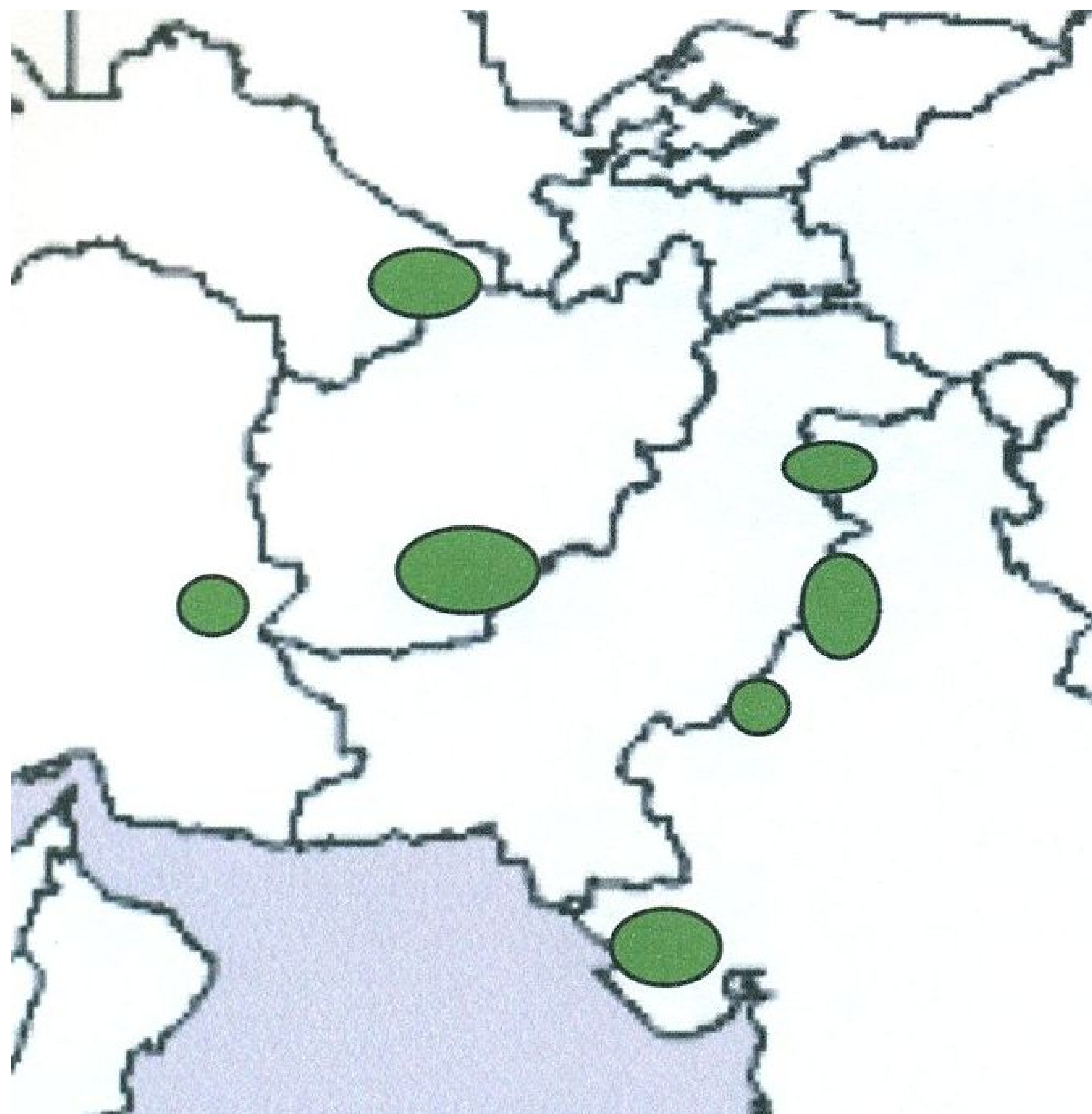
Around Srinagar in Kashmir and in the Jhelum valley of Pothwar plateau lie the remains of an other group of early food-producing Neolithic villages where people presumably lived in pit houses that were scooped out of the soft *karewa* soil, the roof supported on wooden posts around the rim of the pit. This appears to be an alien culture and it had its origins probably in eastern Turkistan or western China. We call it the Northern Neolithic Culture and it existed during the Early Harappan period which we discussed in detail in the last chapter. The Northern Neolithic Culture was eventually subsumed in the Harappan Civilization. Although some of the areas of this culture lied within the presentday boundaries of Pakistan, due to its completely alien character, we have opted to deal with this region as a ‘borderland’.

On the Ghaggar-Hakra system, upstream of Sirsa, along the present-day Indo-Pak border, we find some major Indus settlements, most of them came into being after the decline of the Harappan

The borderlands of Pakistan

Civilization, and thus outside the scope of this volume. However, some settlements did exist prior to the emergence of urban centers, thus a legitimate topic of our enquiry. These settlements existed amidst a local culture, the so-called Sothi-Siswal, with its characteristic pottery, querns, deep claylined bins for storage and terracotta bangles. Some of these sites have yielded a few artifacts showing the Indus contact, especially with Kot Diji variety. Like the northern Neolithic Culture, the Sothi-Siswal province was ultimately integrated into the Indus world or lingered on to be subsumed into post-Indus cultures of the Indo-Gangetic Divide.

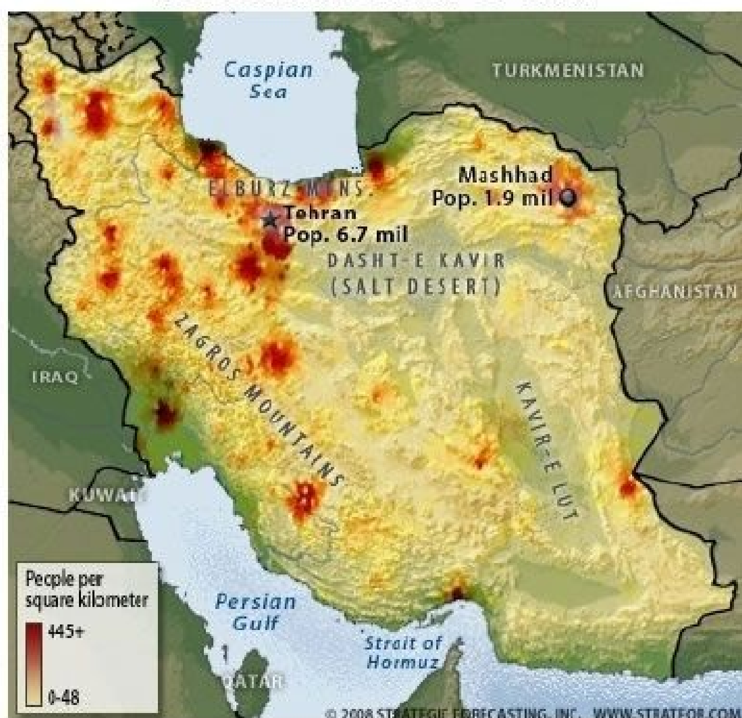
To the southeast, in the neighboring Gujarat, we find a few sites which show some obvious similarities with the Indus culture. These sites lie on the pastoral routes that connected Sindh and Gujarat. It is now well-established that this area was colonized or otherwise influenced by the Indus people quite early on, most likely during the Amri phase discussed in the preceding chapter. Finally, in Rajasthan, across the Thar desert and on the western slopes of the Aravalli range, we find some huntergatherer groups who appear to be entirely uninfluenced by the Indus world, although there might be



The areas of interest in the study of the prehistory of the borderlands

some marginal contact between the two peoples throughout the millennia past. This nomadic pastoral culture is in evidence at several campsites, the most important of which is Bagor. Chronologically, Bagor is contemporary with the Early Harappan and Mature Harappan periods in Pakistan but culturally way behind.

The Indus people interacted with all of these neighbors, with some rather intimately and with others only marginally. For instance, the cultural and technological interaction of the Indus valley has been quite intense with its western and northwestern borderlands; archaeological evidence to this intense and enduring relationship is strong and has been repeatedly highlighted throughout this volume. The interaction with the eastern borderlands was not that intimate but it existed. Here too, quite a bit of archaeological evidence is available to show a relationship between Gujarat and Sindh, and between the Divide and Punjab. Beyond the Aravalli, that is, in central and peninsular India, lived some nomadic hunters-gatherers, the existence of which the Indus man probably had no knowledge of. A Prelude to Civilization



Population centers (red) and the completely uninhabited areas of Dasht-e-Kavir and Dasht-e-Lut (grey)

The same applies to the Ganges plains of northern India.

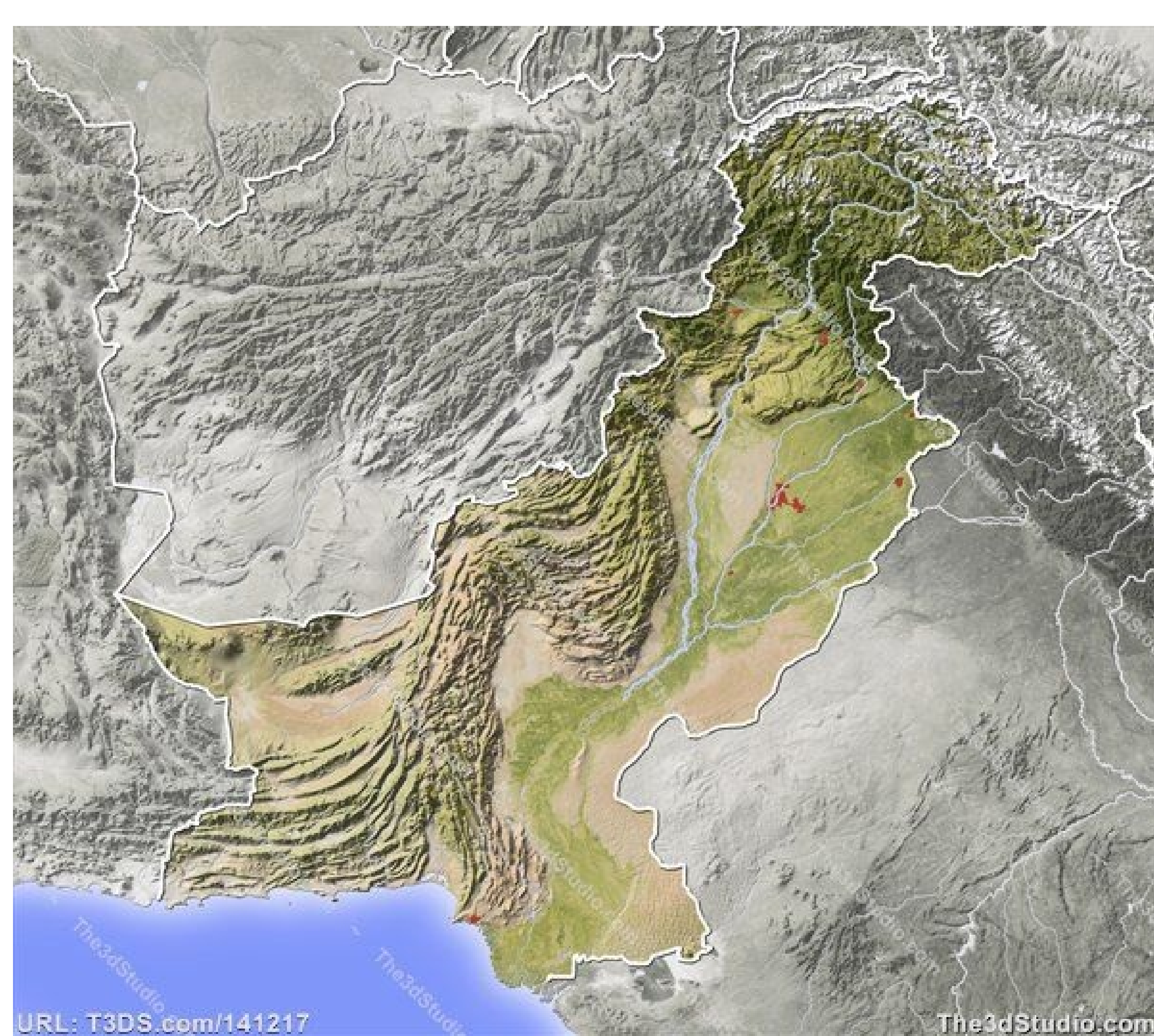
In the followings, we shall examine these cultural interactions and analyze the relevant archaeological data available to us. Where no or little interaction with the borderlands is indicated, it would still be interesting to see as to what sort of cultural developments were taking place there. Of course, wherever possible, some comparisons would be definitely instructive.

THE WESTERN BORDERLANDS

A continued and sustained interaction between prerhistoric Pakistan and the western borderlands, especially the present-day Afghanistan and the area northwest of it, has been alluded to at several occasions throughout this volume. Similarly, a relationship between western Baluchistan and north-eastern Iran has been shown to exert its influence on pottery and crafts across the Khojak Pass and into the Quetta Valley of Baluchistan. A relationship between eastern Iran and southern Baluchistan and Sindh, spreading to as far as Cholistan, has also been indicated, although these relationships between eastern Iran and the Greater Indus Valley were not always intense or sustained. It is evident that all of these cultural contacts were basically a function of geography and the ease of communication which the regional geography provided.

The mountains, which separate the north of Afghanistan from the south and are the effective boundary of the Greater Indus Valley to the West, are generally known since at least the early fourteenth century as Hindu Kush. The Moroccan traveller Ibn Battuta (1304-77 AD), who visited this part of the world in the early 1330s, tells us that “the mountain is called Hindu Kush, which means Slayer of the Hindus, because the slave boys and girls who are brought from India die there in large numbers as a result of the extreme cold and the quantity of snow”. The name may also be a corruption of Hindu Kuh or Hindu Koh (mountain of Hindu or Mountain of the Sindu) and that may probably be closer to the truth since it is beyond this mountain range, coming from the north, that the Indus (Hindu or Sindu) region begins.

The name of the Hindu Kush, however, should only really be applied to that part of the mountains that rises immediately north of Kabul. Here the mountain range is at its narrowest and allows for traffic to proceed via a series of passes. Babur, the Mughal conquerer of India in the early sixteenth century, lists seven of them The modern state of Afghanistan and the adjoining foothills of Pakistan constitute the eastern part of the Iranian Plateau (map of the Iranian Plateau). This highland zone extends from the Zagros Range in the West (along the modern Iran-Iraq border) to the banks of the Indus River in the East. It forms the connecting link between the Near East, Central Asia and the Indian subcontinent and throughout history it has been the thoroughfare for migrations from Central



Topographical map of Pakistan in relation to its western borders

Asia in the north to the Near East in the southwest or the Indus plains in the southeast.

The easiest route from the desert and semideserts of southern Central Asia onto the Iranian Plateau leads via a gap in the mountain chain that bounds the Iranian Plateau in the North. This break lies between the cities of Mashhad on modern northeast Iran and Herat in west Afghanistan. The North-South route via the so-called Herat corridor links up with the two major East-West roads that traverse the Plateau. The course of these two routes is determined by the availability of food and water. Huge deserts, namely the Dasht-e-Kavir in the North and the adjoining Dasht-e-Lut in the South, dominate the center of modern Iran and the Iranian Plateau (map of the Iranian Plateau). These wastelands constitute an enormous barrier and consequently East-West traffic either has to proceed North or South of these empty expanses.

From here the traveller may continue to Central Asia and the ancient towns of Bukhara, Samakand and places beyond. This is the historical Silk Road and also the course of a modern railway link.

From Mashhad, a secondary route leads southeast to Afghanistan, in particular to the old staging post of Herat. Leaving this ancient place the traveler may continue to northern Afghanistan and hence the Hindu Kush past Kabul and the Valley of the Indus. He may also go south, towards the province of Siestan, along the Iran/Pakistan/Afghanistan border, or southeast towards the city of Kandhar. From Kandhar the traveller continues eastward towards the Quetta Valley and hence to the Greater Indus plains via Khojak and Bolan passes, or northeastwards, towards Ghazni and Kabul valley.

The southern route across the Iranian Plateau leads from southern Iran to the drainage basin of the Helmand River in Siestan. From here, it proceeds via Kandhar to the Indus Valley in the East, or the Kabul plain in the northeast. Another possible southern route, which bypasses Afghanistan, leads though Gedrosia, southern Baluchistan, along the Arabian Sea. The importance of this particular route has always been minimal because of the harsh conditions along the way. Alexander the Macedonian followed this route in the opposite direction, thereby almost losing his life and his army.

Wild life in this part of the world is limited. Tigers, which used to roam the banks of the Amu Darya, the shores of the inland lakes of Siestan and until recently the foothills around Jalalabad, have disappeared. So have the lions. However, eagles, foxes, gazelles, hyenas, jackals and wolves can still be found. Wild asses and wild boars were known until very recent times. High up in the Kara Koram and Hindu Kush there are snow leopards, wild goats as well as the markhor and the ibex. Wild sheep and wild goats (ibex and markhor of several types) are also known in southern Baluchistan and Sindh.

The modern state of Afghanistan and the adjoining foothills of Pakistan constitute the eastern part of the Iranian Plateau (map). This highland zone extends from the Zagros Range in the West (along the modern Iran-Iraq border) to the banks of the Indus River in the East. It forms the connecting link between the Near East, Central Asia and the Indian subcontinent and throughout history it has been the thoroughfare for migrations from Central Asia in the north to the Near East in the southwest or the Indus plains in the southeast.Throughout history also, this general area has been a supplier of coveted minerals. Famous are the deposits of lapis lazuli (Urdu and Farsi: *Lajward*) near Sar-e-Sang in the valley of the Kochka river in the northeast of Afghanistan which were mined as early as the fourth millennium BC during the Indus Age. Equally important are the copper deposits at many places in Afghanistan. Also important, especially for the production of bronze, are the tin deposits to the southwest of Herat in Afghanistan.

By the mid-sixth millennium BC, food crops, especially barley and wheat, were being cultivated across most of the Iranian Plateau, lead by the Quetta Valley and Kachi plains in Pakistan. By this time, stone was still the basic material for tool production. This changed with the introduction of metal, and primarily that of copper and bronze, and hence archaeologists often differentiate between a Copper Age (Chalcolithic) and a subsequent Bronze Age, although such a periodization is often arbitrary and particularly not applicable to this region as a whole. On the Iranian Plateau, the Chalcolithic is dated to a period between approximately 5500 and 3000 BC. The Bronze Age continued to the second half of the second millennium BC, which marks the beginning of the Iron Age. Throughout this time, the Greater Indus Valley remained a part and parcel of these developments, sometimes lagging behind a little, oftentimes, however, taking a leading role.

During the Chalcolithic, food production on the Plateau increased, with a concurrent growth of population. At the end, by *ca.* 3000 BC, porto-urban settlements had developed all over the Plateau, following such developments in Baluchistan and Sindh. This process intensified in the succeeding

Bronze Age, and by the early and mid third millennium BC various settlements had grown into small trade centers that were based on craft specialization, inter-regional trade and the exploitation and domination of the surrounding countryside. These centers were located in the small, often isolated enclaves and oases of productive land that dotted the country side. In this respect, the development on the Plateau was rather different from that in the fertile plains of Mesopotamia and in the Indus Valley, where roughly at the same time (third millennium BC) much larger political entities developed, based on a much larger extent of productive land.

The mountain ranges between Afghanistan and the Indus Valley give the impression that Pakistan was somehow isolated from its neighbors in the West and the northwest. Similarly, the absence of any mountain range between Iran and Pakistan gives the impression that the communication between the two must be easy and rather intimate. The fact is, however, different. The western mountain ranges have never posed a barrier between Central Asia and Pakistan; they have been quite porous indeed, and communication between the Greater Indus Valley and the region beyond these mountains has not been difficult at all. The result is that ancient Pakistan was always in close contact with Afghanistan and Turkmenia. On the other hand, a series of deserts intervene between Pakistan and Iran; this geographical factor has always hindered

village sites has been traced from the Zagros to the Vale of Farghana. Tepe
village sites has been traced from the Zagros to the Vale of Farghana. Tepe
Asiab, Tepe Sarab, Ali Kosh, Tepe Guran, Solduz, Tepe Sialk, Chasma Ali,
Asiab, Tepe Sarab, Ali Kosh, Tepe Guran, Solduz, Tepe Sialk, Chasma Ali,
Tepe Hissar, Anau, Djeitun, Chopran Tepe, Namazga, Geoksyur, Kara Tepe, and
Tepe Hissar, Anau, Djeitun, Chopran Tepe, Namazga, Geoksyur, Kara Tepe, and
Chust are some of the sites that have been excavated or otherwise studied. Whilecounterparts in the Middle and Upper Paleolithic
sult, the interaction between them has been rather times. The hilly flanks on the fringes of the Plateau the interconnections between such sites are not altogether clear in every case,
sparse and sporadic.the interconnections between such sites are not altogether clear in every case,provided particularly hospitable environment and it
sufficient evidence has been gathered to show that village life based on a closely is in these regions that agriculture developed andsufficient evidence has been gathered to show that village life based on a closely
comparable technology existed there before 3500 BC. This is not very far from domesticated. Baluchistan comparable technology existed there before 3500 BC. This is not very far from
the same type of developments in Baluchistan—a distance of only a millennium. was one of these regions and so was Mesopotamia
the same type of developments in Baluchistan—a distance of only a millennium.and northern Afghanistan, along with the Teijin re
gion of southern Turkmenia. All this has already
As early as 1942 McCown was
been described in Chapter V.2.
able to show that stylistic ties, sites of Ghar-e-Mar principally in motifs of pottery (Snake Cave) and Ghar-e-Asp (Horse Cave) on theprincipally in motifs of pottery
Balkh River in northern Afghanistan sheds light on
painting, existed between such
the potential of this region for understanding the
disparate sites as Tepe Sialk ondomestication process. Ghar-e-Mar was excavated

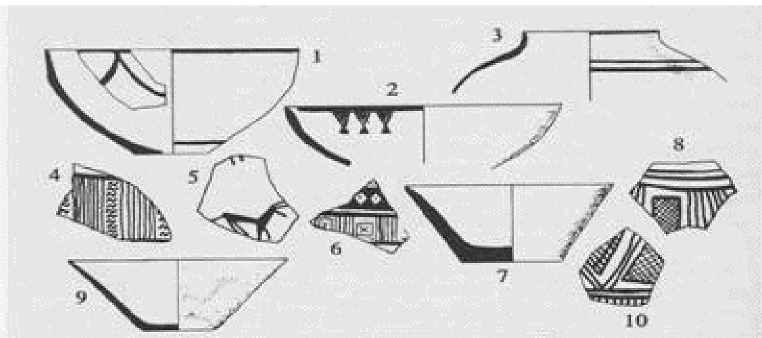
disparate sites as Tepe Sialk on
the western end of the Great the western end of the Great by Dupree in 1962 and again in 1965. Stratified be Salt
low historical materials are ceramic Neolithic mateSalt
DesertDesert and and Anau Anau inin
rial which is carbon-dated around 5930 BC to 5071
Turkmenistan. There is also a

Characteristic artifacts from Mundigak I (*after Casal***)** BC. Below the ceramic Neolithic is nearly a meter ofTurkmenistan. There is also a sand which covers an aceramic Neolithic, carbon Borderlandsstrong archaeological evidence strong archaeological evidence that dated around 7881 BC to 7490 BC. According to that a a strong link existed archaeological evidence, these levels contain the between strong link existed

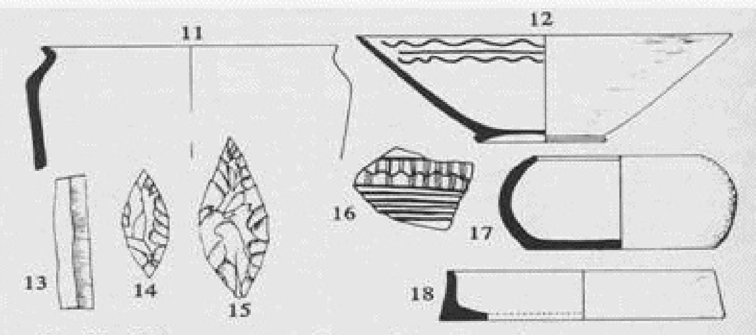
prehistoric site of Mundigak in 1951. The excavations provided evidence for

these sites
these sites
southernas sickle blades.Afghanistan,

seven main periods, of which Period I, II and III are of importance in connectionAfghanistan,



Characteristic artifacts of Mundigak I (after Casal)



Characteristic artifacts of Mundigak II

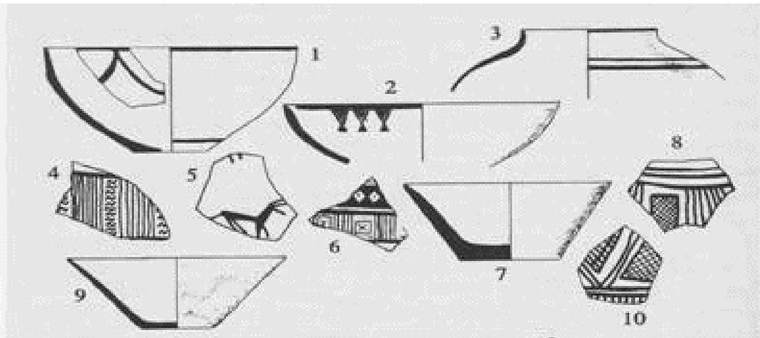
represented by by the the site
and remains of domesticated sheep and goats as well and
as as
of offound at Ghar-e-Mar, with sheep, goats and sickles, represented site

with early Neolithic settlements. The earliest levels are probably representative of a semi-nomadic people who lived in

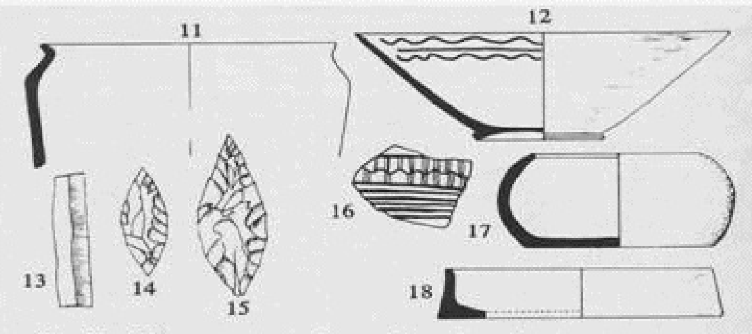
Mundigak. Mundigak, in turn,
is so close to the Quetta Valley
is so close to the Quetta Valley

tents or temporary pole houses of some

culture that the artifacts found
in culture that the artifacts found



Characteristic artifacts of Mundigak I
(after Casal)



Characteristic artifacts of Mundigak II

in both places areare almost kind. Later levels show some evidence of both places almost Characteristic artifacts from Mundigak II (*after Casal*) indistinguishable. The Quetta
rectangular houses made of
mud and

indistinguishable. The Quetta
Pishin Valley, as we know, is
geographically connected with Kachi area at the edge of the Indus Plains throughPishin Valley, as we know, is

stone. Hearths occur in the centers of the

geographically connected with Kachi area at the edge of the Indus Plains through

the Bolan Pass. Thus, ancient Pakistan was intimately connected, not only by
back to as far as the Stone Age. Since these links the Bolan Pass. Thus, ancient Pakistan was intimately connected, not only by
geography but also by trade not only with northern Afghanistan but also all

appear to have been so strong and enduring, they
geography but also by trade not only with northern Afghanistan but also all
must lead us to enquire whether they were the re
around the Iranian Plateau.
sult of trade and exchange alone or they involved

The Quetta-Kandhar Connection: Pakistan as well as Afghanistan. In the To the north of Kandhar city is a valley

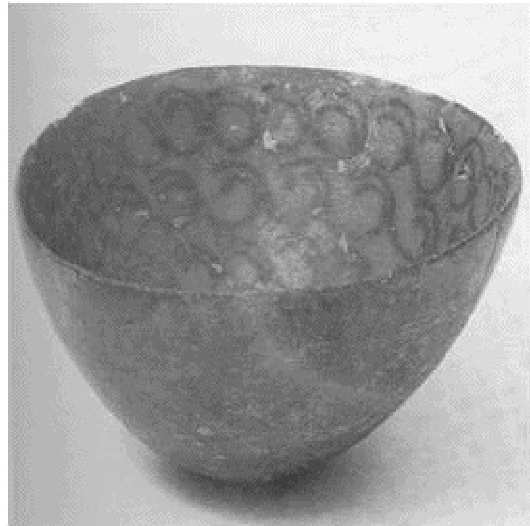
The Quetta-Kandhar Connection:

tory, and of continuing movements of peoples down To the north of Kandhar city is a valley midst of the houses occasional ovens or above the valley of the Argandab River called the Kishk-i-Nakhod, whereinto Pakistan from the northwest, one may legiti
French Archaeological Mission in above the valley of the Argandab River called the Kishk-i-Nakhod, where mately expect movements of peoples to have beenkilns were located. Some of these were Afghanistan discovered the prominent
a apparently for pottery manufacture. We

must also recall that the beginnings of such con
tacts were already several thousands years old bePage 330
fore the Indus man took to agriculture and sedenPage 330
tary living. It is through these contacts that ancient Pakistan exerted a strong influence on Afghanistan and Central Asia up to the western borders of China, while being influenced by the cultural traits that the incoming people from these areas must have brought with them to the western regions of Pakistan.

**The Neolithic Period and the Develop
ment of Agriculture:** Some of the earliest evidence for domestication of sheep and goats in the western borderlands and the presence of wild grasses that were later domesticated comes from neighboring Afghanistan and Tukmenia. The whole of Iranian

Plateau was within the natural range of these ani mals, as demonstrated by the presence of their



Pot of Chashma Ali type
(Metropolitan Museum of

457

French Archaeological Mission in Afghanistan discovered the prominent

Mundigak III, painted pottery (*after Casal*)



Mundigak III; painted pottery
(after Casal)

yielded a calibrated carbon date of 10,035 BC. Thus, it appears that sheep and goats were proba

The characteristic

bly domesticated in this region around 10,000 BC.

pottery is a

Chronologically, this would be contemporary with

painted ware, black-on-red, very

the Early Natufian in the Middle East (see Chapter

similar to that of KiliIV.1.) and earlier than Baluchistan. The presence ofGhul

sickles does not indicate developed agriculture but

it does indicate that at least wild grasses were reguMuhammad in the Quetta Valley.

larly harvested. Mehrgarh was already food produc

ing settlement in eighth millennium BC and it is notThis ware is wheel made and has its

known as to when the the process of domestication

closest typological affinities toactually started there. All this evidence points to the
development of agriculture and the emergence ofChasma Ali's culture in northern

Neolithic settlements in the western borderlands

almost contemporaneously with those in BaluchisIran. Later levels not only contain
tan. examples of the Kili Ghul Muhammad ware but add the jars and cups, including black and red
polychrome painting, familiar in Borderlands!
Around 6,000 BC, several agricultural vilBorderlands!painting, existed between such disparate sites as

lages seem to flourish in the small river valleys
along the foothills of the Kopet Dagh range in
Tepe Sialk on the western end of the Great Salt Desert and Anau in Turkmenistan. There is also a

By the fourth millennium BC, the Kandhar area was integrating with the Quetta
By the fourth millennium BC, the Kandhar area was integrating with the Quettaexisted between these sites and southern Afghani
Valley into practically one single cultural zone. Mundigak in Afghanistan and
Valley into practically one single cultural zone. Mundigak in Afghanistan andthe preceding Chapter of this section). Mundigak, in
Shahr-e-Sokhta in northern Iran even became cities or at least important caravan

and western Sindh. From about 4000 BC there was artifacts found in both places are almost indistin

campsites of the region and intimately interacted with the the Indus cultures in northern and central Baluchistan. It appears that during the period 3200-2600

mental alloys. The Bactrian camel drew fourThus, ancient Pakistan was intimately connected by

BC, this cultural integration was further intensifying, marked by the presence of the the same same

cotta and bead-making crafts. The

fortified decorative of Altyn-depe pottery ished in this area.as that at in Quetta valley In the southwest, with theas that at

development of agriculture, the

Mundigak, Deh Morasi and Said Qala in the Kandhar Said Qala in the Kandhar

prehistoric site to be excavated in

District of Afghanistan, and

BC. It is in this region that we first

to a certain extent at Shahr-e

take between the Kandhar region

Sokhta in Iranian Siestan. The origins

Iran, and Quetta valley in Paki

ofof this stan. This interaction zone, somepottery tradition,

times called the Helmand Civilization, is obviously important in con

especially, the

text with the development of vil

decorative style, havelage farming communities in Balubeen traced

chistan and Kandhar regions. It

to to the must also have played a key roleNamazgah

in the development of a regional

culture in Tukmenia, during 3600-3000 BC.

scribed in the preceding chapters of this section.
Development of Village

Striking similarities between

of early farming village sites has

the decorative art of Quetta

Vale of Farghana. Tepe Asiab,

Valley, Tepe Sarab, Ali Kosh, Tepe Guran,Shahr-e-Sokhta, Mundigak,

Solduz, Tepe Sialk, Chasma Ali,

H i s s a r,Namazga, D j e i t u n ,and

Chopran Tepe, Namazga,

Kopet Dag, was the result of this this

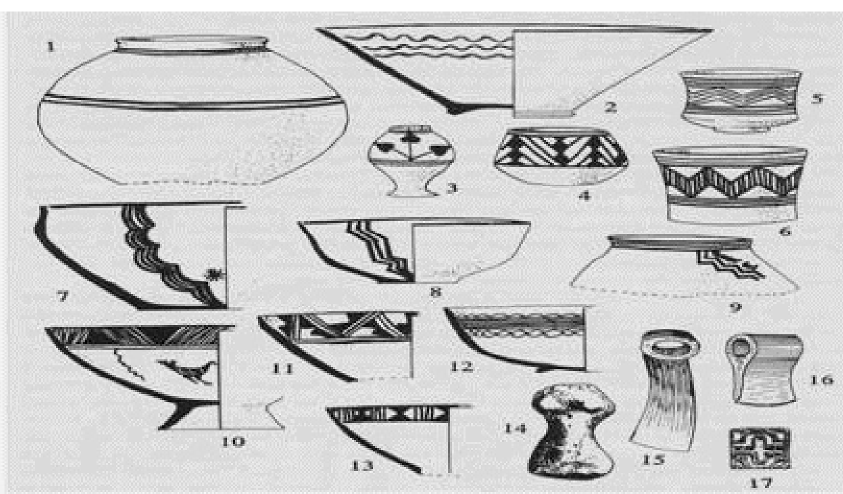
are some of the sites that have

processprocessbeen excavated or otherwise studof cultural
ied. While the of interconnections

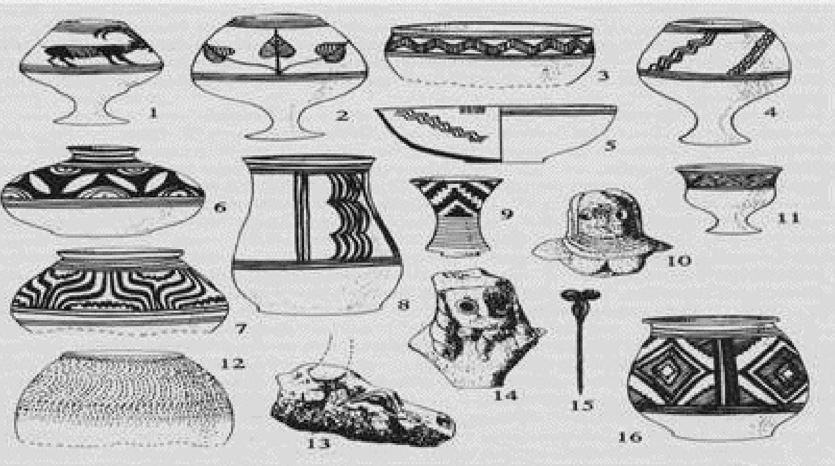
gether clear in every case and

links between Shar-e-Sokhta their chronologies are not yet certain, sufficient evi
and Mundigak are proven, so dence has been gathered to show that village life
and Mundigak are proven, so based on a closely comparable technology existed

Characteristic artifacts from Mundigak III (after Casal)

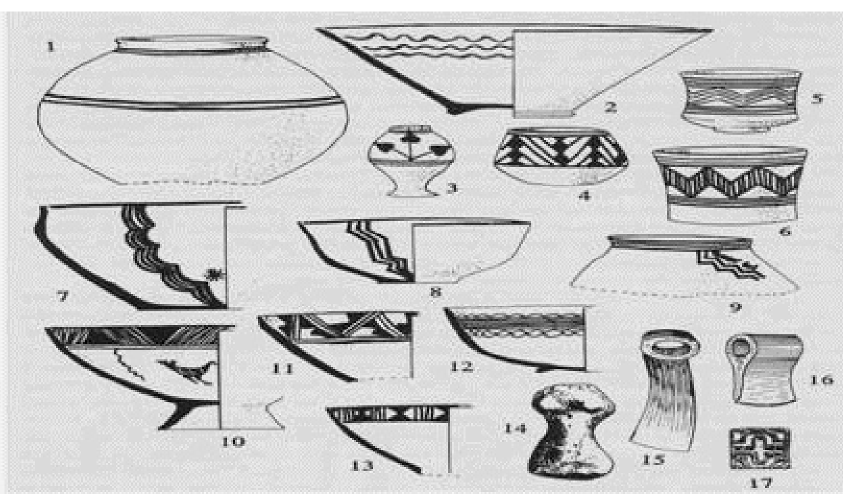


Characteristic artifacts of Mundigak III

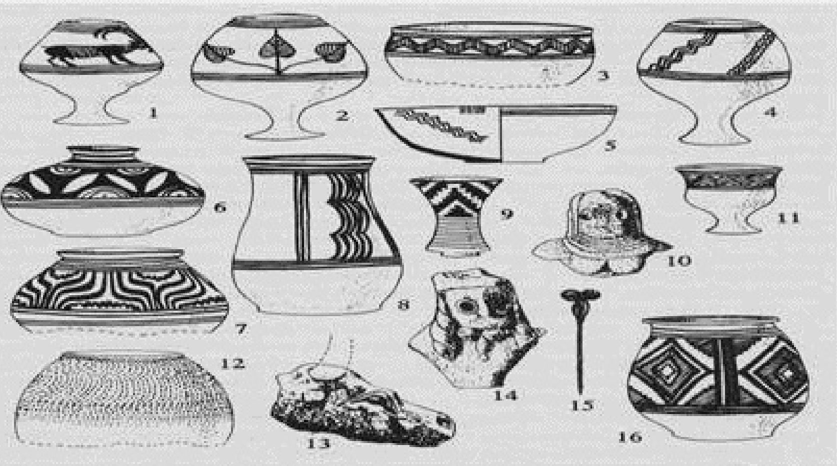


Charactaristic artifacts of Mundigak IV
(after Casal)

integration. The Early Indus **integration. The Early Indus** **Characteristic artifacts from Mundigak IV (after Casal)**



Characteristic artifacts of Mundigak III



Charactaristic artifacts of Mundigak IV
(after Casal)

geography as well as trade not only with northern Afghanistan but also all around the Iranian Plateau.
The Quetta-Kandhar-Namazga Connec

tion: To the north of Kandhar city is a valley above

are the links with Mundigak, Quetta, and Mehrgarh. In this context, Kandhar and
are the links with Mundigak, Quetta, and Mehrgarh. In this context, Kandhar and
Mundigak in Afghanistan interacted with the Quetta Valley and further on with
As early as 1942 McCown (44) was able toMundigak in Afghanistan interacted with the Quetta Valley and further on with the Kachi plains with particular intensity. In fact, after the discovery of extensive
the Kachi plains with particular intensity. In fact, after the discovery of extensive
remains of painted pottery in Baluchistan, much of the archaeological literature
remains of painted pottery in Baluchistan, much of the archaeological literature
concern was devoted to finding analogues of these painted designs in the
concern was devoted to finding analogues of these painted designs in the
prehistory of Southern Afghanistan, northern Iran, and Central Asia. Sometimes

northwest of modern Kandhar along the Kishk-i Nakhod Rud, a tributary of the Arghandab river. It occupies a strategic position along one of the routes that lead from the mountainous lands in the north to the fertile and extensive Kandhar plains in the South. The Kandhar oasis itself forms a bottleneck implements were widely used from the very begin

It seems obvious from the above discussion that these pockets of

for any traffic between East and West, since it is ning. All of this indicate that the site was probably
bound to the north by the mountains of central Affounded by the people from the adjacent Quetta ghanistan and to the south by the inhospitable Reg

populations were already in tune with each other; they adopted the culture of

Valley or the people who had very close contact
istan Desert. Here various rivers from the northeast with the Quetta Valley people. It is also from this and east flow into the Arghandab river, which itself

one another, enhanced it in their own fashion, and mutually shared the fruit of

period that the first lapis lazuli beads were attested.
empties into the Helmand some 130 km further These beads might indicate, as traditionally aswest. The plentiful supply of water and its strategic

the common heritage of the region. Such is this evidence that we can be

sumed, contacts with the famous lapis lazuli mines position have made the Kandhar oasis site one of in Badakshan, but should perhaps more logically be

the most important districts of the country, and thereasonably secure in postulating a strong diffusionary movement in the period

Mundigak site represents its oldest permanent setnearby Chagai hills in Baluchistan. The excavators

tlement known to date.after 3500 BC. The question, however, remains unanswered as to the direction of

The excavations provided evidence for which is well-known in the Greater Indus valley. This

seven main periods, of which Period I, II and III arethis movement. Fairservis takes pain to depict this diffusion from the northeast

of importance in connection with early Neolithic setPishin valley.

Iran to the northern Baluchistan through the Kandhar region of Afghanistan.



Material culture of Namazga II (*after Masson*)

Although these efforts could be construed to prove the colonial theory of tlements. The earliest levels are probably represencultural diffusion "from-west-to-east", some of the archaeological evidence is tative of a semi-nomadic people who lived in tents millennium BC, the pottery shows some regression or temporary pole houses of some kind. Later levels indeed overwhelming in favor of Fairservis and Piggott. Some elements of urbanshow some evidence of rectangular houses maderated. On the other hand, the houses were well built of mud and stone. Hearths occur in the centers ofculture at Mundigak and Shahr-e-Sokhta definitely pre-date those in the Quettathe main rooms, which are reminiscent of the curOther finds from Period II include sling stones, rent practice in the cold regions of Pakistan as wellvalley, Mehrgarh, and early period of Mohenjodaro. stone arrow points, copper artifacts, cone-shaped

as Afghanistan. In the midst of the houses occaspindle whorls, bone awls, alabaster vases and beads of lapis lazuli. The archaeologists also dis

Nevertheless, in spite of the evidence for 'from-west-to-east" theory, there is no

concrete archaeological basis for assuming such a position and it has been consequently challenged by some archaeologists and prehistorians of modern

sional large ovens or kilns were located. Some of these were apparently for pottery manufacture.

Borderlands!Period I-II pottery found in and around the

houses includes wheel-made wares often with painted decorations. It was also noted that copper covered the first example of a stone stamp seal. Such seals belonged to a tradition that in the fourth millennium spread all over the Iranian Plateau. Such seals are, for instance, known from many other Chalcolithic sites on the Iranian Plateau, such as Sialk III and Tepe Hisser IB-C as well as from contemporary sites in Baluchistan and the Bannu plain.

The characteristic pottery is a painted ware, black-on-red, very similar to that of Kili Gul Muhammad in the Quetta Valley. This ware is wheel made and has its closest typological affinities to Chasma Ali's culture in northern Iran. Later levels not only contain examples of the Kili Gul Muhammad ware but add the jars and cups, including black and red polychrome painting, familiar in Quetta as the Kechi Beg ware, and which, in turn, have their equivalents in the early Hissar culture of northeastern Iran. These affinities with Chasma Ali, Hissar, and Kili Gul Muhammad are significant as they clearly show the evolution of a common or at least a related culture throughout the region of northwest of Blauchistan and southern Afghanistan.The finds from Mundigak Period I-II are thus not an isolated phenomenon, but should be placed within a much broader context of developments all over the Plateau and beyond.

The excavated items from the next phase in Mudigak's history, Period III, are comparable to finds from the nearby site of Said Qala. The pertinent levels at the two sites date back approximately to the period between 3500 and 2800 BC. The French archaeologists at Mundigak many copper and bronze utensils, bronze shaft-hole axe and adze, and large numbers of crude female figurines. They also found square and circular compartmented stamp seals, often made of steatite. The cone-shaped whorls of Period I-II are replaced by disk-shaped examples.

The ceramic assemblage, now mainly consisting of decorated wheel-made wares, includes the so-called Quetta Ware. As described in the last chapter, the Quetta Ware is a striking and boldly decorated type of pottery of red-buff color, with a light slip, and decorated with black designs. Apart from this Quetta Ware, the ceramics from Mundigak III include other wares that commonly found in Quetta valley and neighboring lands. In fact, the similarities between the ceramics from Mundigak and Said Qala on the one hand, and the site of Damb Saadat II in the Quetta valley on the other hand, speaks of as single cultural complex.

Comparative material to the Quetta Ware is known from among the ceramics of the so-called Namazga III assemblage, which was brought to light much further in the north, in modern Turkmenistan and which is generally dated to the second half of the fourth millennium BC. The Namazga sequence is concentrated in the foothills along the Kopek Dagh mountains, southeast and northeast of modern Ashkhabad, the capital of modern Turkmenistan. In the Namazgah period, people started discovered

including a to move west from the center of the Namazga lands and they colonized the oasis of the Teijin river (the Hari Rud), to the west of the Mawr oasis and just northwest of Afghanistan. Here they developed what is generally known as the Geoksyur Culture, named after the type site in the oasis. One of the characteristics of the Geoksyur Culture is the use of buff pottery with a buff slip, decorated with polychrome (black and red) motifs. These motifs are strikingly similar to those shown on the Quetta Ware. In addition, the seated female figurines found in large numbers in the Teijin oasis recall

comparable figurines from Said Qala and sites further east in Baluchistan.

Anotherinterestingparallel,althoughat present insufficiently studied, is that of funerary customs. In the Geoksyur oasis multiple burials were found in circular tombs made of mudbrick. Comparable graves were found at Mundigak in the later levels of Period III. Here, stone-lined chists contained collective burials of corpses or their parts, some of which had been dressed elsewhere. In earlier levels from the same Period, the dead were buried in simple contracted burials.

By the fourth millennium BC, the Kandhar area was fully integrating with the Quetta Valley and north-eastern Siestan (Iran) into practically one single cultural zone. Mundigak in Afghanistan and Shahr-e-Sokhta in northern Iran even became cities or at least important caravan campsites of the region and intimately interacted with the the Indus cultures in northern and central Baluchistan. It appears that during the time period of 3200-2600 BC, this cultural integration was further intensifying, marked by the presence of the same decorative pottery in Quetta valley as that at Mundigak, Deh Morasi and Said Qala in the Kandhar District of Afghanistan, and to a certain extent at Shahr-eSokhta in Iranian Siestan. The origins of this pottery tradition, especially, the decorative style, have been traced to the Namazgah culture in Tukmenia, during 3600-3000 BC.

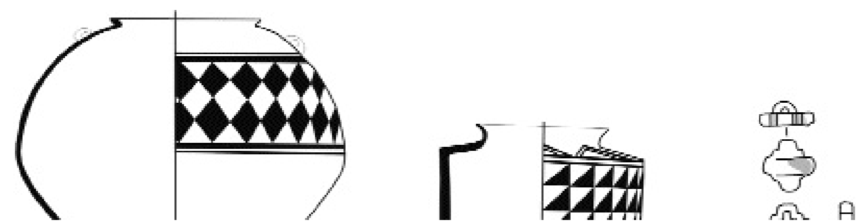
Striking similarities between the decorative art of Quetta Valley, Shahr-e-Sokhta, Mundigak, Namazga, and Kopet Dag, was the result of this process of cultural integration. The Early Harappan links between Shar-e-Sokhta and Mundigak are proven, so are the links with Mundigak, Quetta, and Mehrgarh. In this context, Kandhar and Mundigak in Afghanistan interacted with the Quetta Valley and further on with the Kachi plains with particular intensity. In fact, after the discovery of extensive remains of painted pottery in Baluchistan, much of the archaeological literature concern was devoted to finding analogues of these painted designs in the prehistory of Southern Afghanistan, northern Iran, and Central Asia. Sometimes excesses have been committed but by and large these efforts have been quite rewarding.

It seems obvious from the above discussion that these pockets of local populations were already in tune with each other; they adopted the culture of one another, enhanced it in their own fashion, and mutually shared the fruit of the common heritage of the region. Such is this evidence that we can be reasonably secure in postulating a

strong diffusionary movement in the period after
Shahr-i Sokhta Revised Sequence Other allochtonous materials from Phase 4 contexts
3500 BC. The question, however, remains unan
are one pancake and an ivory bead from the Central
Fairservis takes pain to depict this diffusion
Quarters. A second pancake with traces of an unfortu
from the northeast Iran to northern Baluchistan
through
the
Kandhar
region
nately too worn seal impression was recovered in the
of Afghanistan and

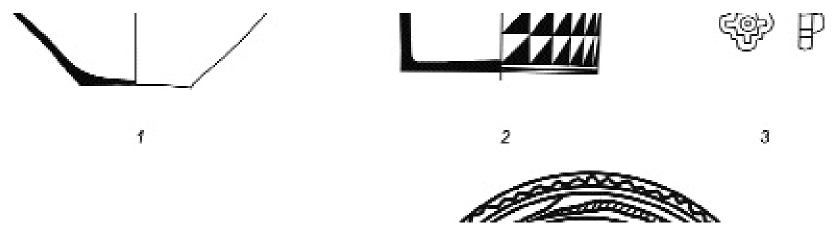
Phase 5b garbage heap in NXU. The presence of pancakes in pre-Harappan contexts in the Indus

Valley as well as in the Quetta region and the lack of Mature



Harappan related items in Phase 4 deposits at Shahr-i Sokhta, is an indirect confirmation of the chronology above suggested for this transitional Phases.

The only two radiometric determination we can



surely assign to a Phase 4 context[11] give a maximum probability range between 2500 and 2300 BC, a dating which fits well in the above reported series for Phase 5.

Phase 3 is known at Shahr-i Sokhta Central Quarters



as a structural enlargement of an imposing building of

5

Fig. 5 – Kot Dijian jar from Shahr-i Sokhta "House of the Jars"

Phase 4 (Salvatori & Vidale 1997). From two storerooms

in the Central Quarters. **A Kot Diji jar recovered from the 'house of jars' at** of this adjoined structure, a





well-stratified amount of pot tery was collected,
still waiting in Tehran State Museum
Mundigak, which marks the beginning of a well known
regionalization trend. In particular we can mention a pos
for a systematic study. At the time of the excavation we
itive affinity between the materials of Mundigak III.6 and
recorded among other interesting items the occurrence of
those of Shahr-i Sokhta Phase 8, affinity which concerns
painted pottery (Fig. 9) previously known from Tepe
both pottery shapes and painted decoration, with the only
Rud-i Byaban
2 and strongly
related,
exception of stereometric decorative motives apparentlyas formerly still present at Mundigak III.6.





assessed by R. Biscione (1974), to Mundigak IV.3 pot
From Phase 7 levels we have a good number of highly tery shapes and decorations. Associated to the above
converging radiometric determinations[8] pointing to a **Left: Chalcolithic bowl from Shar-e-Sokhta I.**

some other archaeologists, such as Piggott, have followed his lead. Although these efforts could be construed as "colonial thinking", some of the archaeological evidence is indeed overwhelming. Some elements of urban culture at Mundigak and Shahr-e-oSkhta definitely pre-date those in the Quetta valley, Mehrgarh, and early period of Mohenjodaro.

Nevertheless, in spite of the evidence for 'from-west-to-east" theory, there is no concrete archaeological basis for assuming such a position and it has been consequently challenged by some archaeologists and prehistorians of modern times. The fact is that for the larger body of ceramics, there is as much reason to propose that the wares originated in Central Baluchistan, as there is

chronological basis to support the east-to-west and south-to-north hypothesis. Both Central Baluchistan and Central Asia have data to support either of the positions just stated but there is sound internal evidence for the development of the Quetta Ware in both regions, Quetta-Pishin Valley definitely taking the lead.

An alternative to this model, and one that satisfies the evidence for the development of Quetta Ware, has been proposed by Possehl. He does away the donor-receptor relationship between these regions and restates it in terms of mutual interaction, as in an interaction sphere proposed by Caldwell many years ago. According to this model, the peoples of Central Baluchistan, Central Asia, and northeast Iran established an enduring relationship, probably a series of them, and part of this involved the manufacture of ceramics, figurines and seals, which developed side by side in the area encompassed by this interaction sphere. Irfan Habib, a prominent historian of India, although not stating his position directly, tends to subscribe to the Possehl's position.

Siestan Connection: Siestan in the mentioned painted pottery we recovered an almost com**Fig. 2 – 1) Buff ware jar with pseudo nose-lugs from grave 413. 2) Nal pot from grave 413. 3) compartmented bronze stamp seal from Tepe Rud-i Biyaban 2. 4) Faiz Mohammed gray ware bowl from grave 731. 5) Chalcolithic bowl**

Right: Chalcolithic bowl from Mundigak III . Note the

from Shahr-i Sokhta Period I. 6) Chalcolithic bowl (?) from Mundigak III.6.

For Phase 6 we cannot refer to imported items, but

partalellism.

we can mention the strong stylistic similarity which links a zoomorphic bronze compartmented stamp seal from room CDLXXIII of a house in NXK in the Central

Northeast of Iran is as important as is Central Asia in context with the developmental history of ancient Pakistan and its relationship with western borderlands. The perennial water of the Helmand makes

cultural series nowadays available for the surrounding The complex stratigraphic situation of a site like Siestan an oasis in the midst of deserts. In the me

Quarters (Salvatori & Vidale 1997: fig. 252: 5) with a

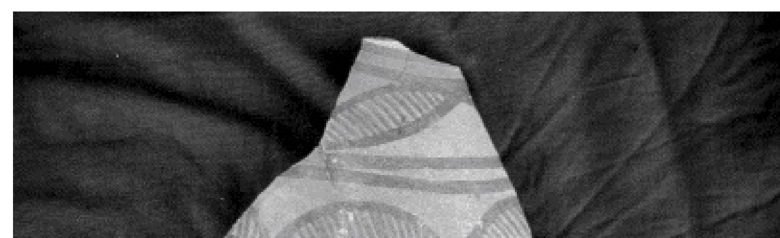
areas. Such a correlation could be considered as an index Shahr-i Sokhta, with overlaps of structural phases, fillings dieval times, Siestan was a critical station on the bronze stamp seal from Nausharo IB (Jarrige 1974-1986: route from Kerman, in southeastern Iran, to Kandof rough synchronic relations. In the present work, data or shave of buildings to the level of the floors, total pl. XXXIX.b left). har and Turkestan, connecting the former to a net coming from the Shahr-i Sokhta graveyard and the site of rebuilding or repeated raising of floor levels with forced

Tepe Rud-i Byaban 2 have been combined with those To Phase 6 only three charcoal samples can be surely rearrangement of building plans, has compelled the work of trade routes, commonly referred to as the [7] whose average ascribed[9] which establish an approximate calibrated

from the extensive excavations of the Eastern Residential authors to critically review the provenance and confi Silk Road. One can surmise that Siestan was duly

Area (Tosi 1968, 1969, 1983), the Central Quarters (Sal range between 2650 and 2570 BC. dence of the samples submitted to radiometric determi connected with the region to its north as well as to vatori & Vidale 1997) and the Burnt Building (Tosi 1983; nation, taking into serious account the questions arisen by

From Phase 5 deposits we have no allochtonous items its South during the time period covered in this vol

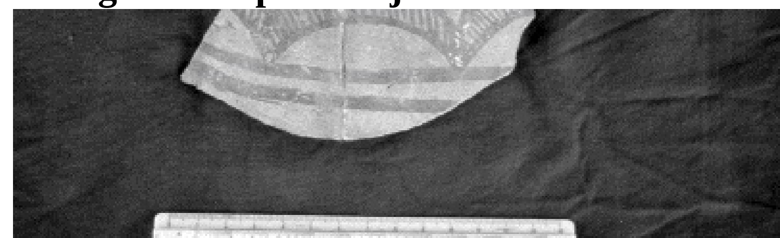
ume.

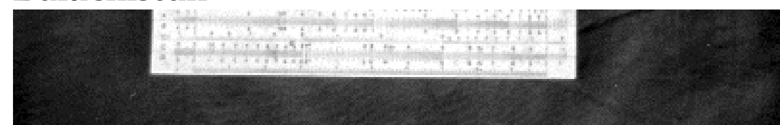
Biscione 1979).except for an unpublished bowl fragment from the CenG. Possehl (1993: 242-44). tral Quarters excavations which finds precise comparisons in the southern Turkmenian pottery tradition of the

2 8 2 Namazga IV period (Kohl 1984: pl. 9 a and b). But, the ceramic complex of Phases 6 and 5 is, as well known, hugely coincident with that of Mundigak IV.1-2.

Finally, we have to emphasize the occurrence of Nal pots until the end of Shahr-i Sokhta Period II. Good

A fragment of painted jar from Shar-e-Sokhta. Note the

**semblance with pottery from southern Baluchistan**

2 8 5

461

Fig. 9 – Fragment of painted jar from phase 3 layers in the Central Quarters.

British surveyors and travelers from about 1860 had noted that Siestan was strewn with ancient remains. It was Sir Aurel Stein, however, who discovered that the area to the south of the great *hamun* was the locale of numerous sites of prehistoric time. Later, Fairservis extensively explored this area. His analysis of the finds along with those of Stein indicates that generally one major phase of prehistoric occupation is represented. This was a

Sarai Khola, near Taxila.

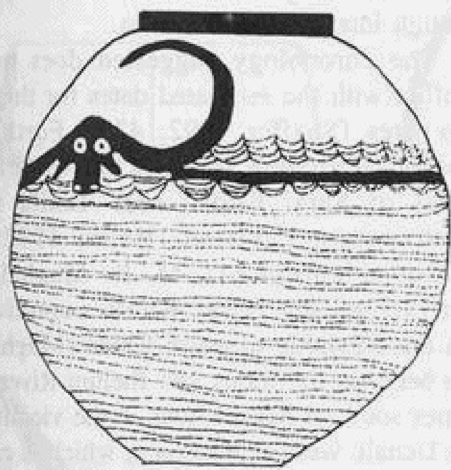
There is a long list of products found at

Burzahom represents a movement out**Early Harappan and Mature Harappan sites on the**

In Search of Cultural Sequence***of North Asia toward and into northern*****the**

phase of developed farming villages that flourished

ground stone tools, and the dog burials.



Kot Diji Phase pot from Burzahom IB
(*after Possehl*)

Northern Neolithic culture. Similarly, quite a few In
have come to refer to this material as the “Northern here probably around 3000 BC. According to Fairs

***Pakistan of a more limited kind than*dus products have been found at Borzahom. For**

Neolithic”. Sites of this affiliation begin just after the

ervis, these people lived in mud-brick squarish*out*development of village farmingexample, two Kot Diji Phase type pots were found,*into*

houses in settlements varying from a few families to

of Central

one of them contained 950 beads of carnelian and Baluchistan and the Indus plains; they are thus con

probably as many as six hundred to a thousand agate and was decorated with the face of a water *e Indus plains* souls. They were extensive users of copper, which *Baluchistan and th*buffalo. These artifacts are undoubtedly of imported

they made into pins, needles, axes, knives, beads,
logical aspects of this culture must be quite clear to

previously

origin rather than the products of the Northern Neobangles, and possibly figurines. This copper was the reader: although it is a neolithic culture, its mined,
smelted,

hammered,
and
possibly
cast.
dus people with the northern Neolithic people is not

lithic people. The extent of the interaction of the In*southmost*

They were fine carvers of stone and were particu

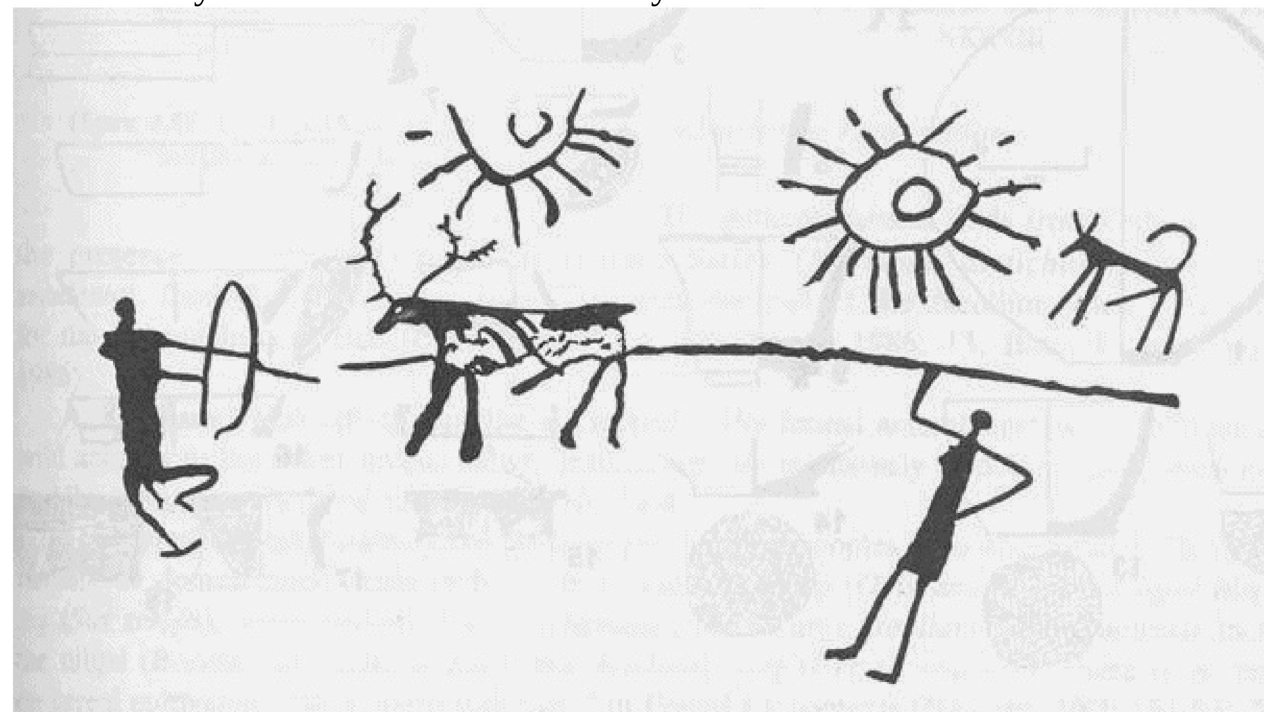
Burzahom*chronological setting is at least two millennia later *the

***expression of a widespread North Asian*yet clear. Still, it is obvious that these peoples were larly fond of vessels made out of alabaster. They**

wove mats and probably cloth and made baskets. at least among those that the Early and Mature

As potters they made a variety of shapes with a buff *complex. It represents a movement that*clay on which they frequently painted geometric and areas of ancient Pakistan till it was absorbed by the

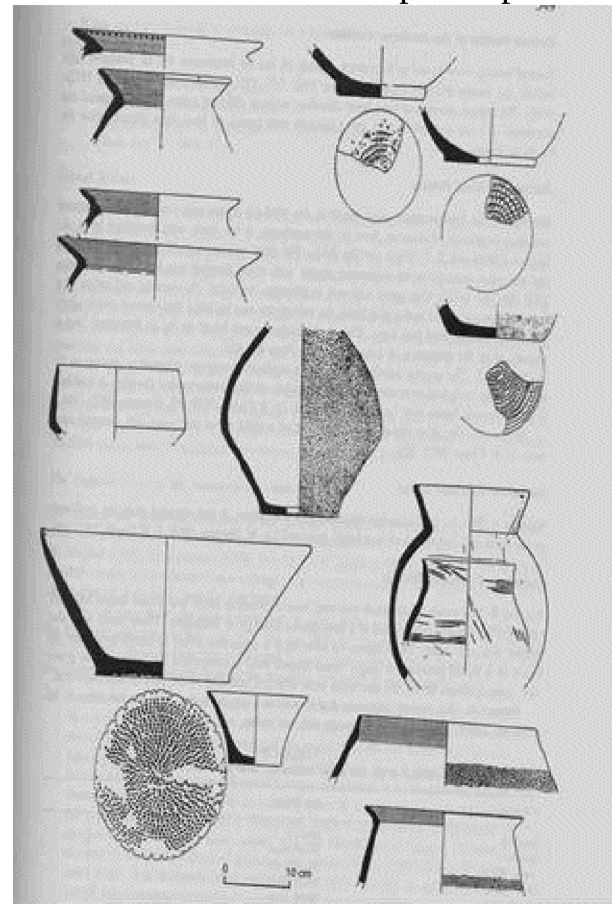
occasionally natural motifs in black. Very common


Hunting scene on a stone slab from Burzahom *(after Pande)*

Hunting scen e on a stone slab at Burzahom (after

Neolithic sites in the Vale of Kashmir: Burzahom and Gufkral. They lie on the
Central Asia right from the Paleolithic times. We

Indian side of Kashmir. Twenty-five settlements of this type have been reported
also observed the active participation of Central and quite extraordinary in its delicacy was a light



Northern Neolithic material from Sarai Khola (*after Halim*)

Kot Diji Phase pot from Burzahom **grey pottery which too was often decorated with and plants, the development of agriculture-basedBurzahom and Gufkral:black painted designs. The dead were buried in a economy, and establishment of settled villages. Theflexed position in chists made of mud brick. Funerby radiocarbon dates, and some comparative analysis. They span from 2800 to**

ary furniture was placed with the corpse and in
rise of arts and crafts, and the evolution of incipient
2000 BC , thus encompassing both the Early and the Mature Harappan Stages.
cluded pottery, jewelry, and such objects of daily life
urban life in Central Asia went hand in hand with
The late Neolithic dates are from 2000 to 1500 BC, a time represented by Late as tools and weapons. that in Pakistan. These cultural, technological, and

Craft products at Shahr-e-Sokhta also in ***may well have started with the Mesolithic***

cluded beads of several kinds of stone, including ***of Europe and which survived in the*****turquoise and lapis lazuli. A quantity of debris from bead-cutting has been found in the residential ar*****fertile valleys of Kashmir and perhaps of*** **eas, and two graves at Shahr-e-Sokhta have bead makers' tool-kits interned with the dead, just like the** ***Hunza, Baltistan and Ladakh. It is so***

example at Mehrgarh sited elsewhere in this book. time. Additionally, we have highlighted the relation

The most fascinating aspect of Shahr-e-Sokhta is ***clearly*****ship of the advanced settlements in the south of*****inner*** **its location: it is accessible from Kandhar by a route**

down the Helmand used by pastoralists; it is con
nected with the Tedzen delta and Turkmania in the
Afghanistan with those of Central Asia. The cultural

difficulty**relationship of Alyne Deep in Turkemania with Mun*****Pakistan's archaeology except for the fact*****north by a major natural highway with exceptionally**

good pastures.
related to the Quetta Valley and by extension with

that it existed in the river**A similar situation did not exist between**

Siestan and southern Baluchistan for geographical
reasons. Although we do find some clear indications
of cultural interaction between these two regions,
these interactions were rather limited. There is a

this extensive cultural exchange. Thus, a picture of

Pakistan.**prehistoric Central Asia emerges that displays a**
The Northern Neolithic tradition is a**series of deserts between southern Baluchistan and Iran. The principle means of interaction were most** ***definitive manifestation of*** **likely the pastoral nomads rather than trade. Since** ***cultural streams, which were through time*****the movement of nomad depends on the availability occasional of water along the migratory paths, it must have** ***directed toward Pakist*****heavily depended on climatic conditions, of which rain must have been a crucial element. This ex****The Northern Neolithic material from Sarai Khola,** ***Northern Neolithic material from*** **plains the sporadic nature of**

these contacts. Pothwar region, Punjab; Mid third millennium BC
NORTHERN NEOLITHIC REGION ***Sarai Khola (*****(after Halim)*****after Halim)***
the

Cholistan in the East and the Zogros in the West.

existence

The similarities in painted motifs on pottery consti

culture in the northern borderlands of
Pakistan and its interaction with the Indus
An interesting cultural tradition which is urban culture of the Greater Indus Valley that was to***tant. It differed from the*** **completely different. Here we see the Indus man**

markedly
differed
from
that
of
the
farmers
and
THE EASTERN BORDERLANDS
come. There is no doubt that in doing so, the north
herders of the Neolithic Indus and Central Asia was

cultures is especially impor**ern culture must have left behind some desirable**

In the above we reviewed the prehistoric
of
Pakistan.
traits for the benefit of the ensuing urban culture,
developments in the borderlands to the West and almost completely isolated from the peoples to his

East. There is no robust interaction zone, there is ***lar in nature to those of the Indus***

no commonality of culture, there is no mutual effort

discovered at the northern fringes These peoples were centered in Kashmir, although their settlements do extend into

the Northwest of Pakistan and examined how the***also differed from the***

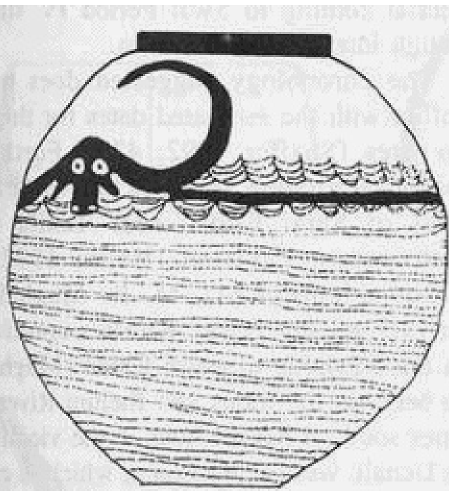
logical Survey of India has conducted major excaing communities, there is no participation of the Swat and northern plains of the Greater Indus Val Indus man interacted with the inhabitants of these vations at twoo Northern Neolithic sites in the Vale ley, at places like Sarai Khola and possibly Uchali. of Kashmir: Burzahom and Gufkral. They lie on the *Page 338* They represent a cultural tradition whose origin is Indian side of Kashmir. Twenty-five settlements of 517 most likely outside of Pakistan as well as outside its this type have been reported so far. They are con eastern and western borderlands. Archaeologists centrated in the southeastern quadrant of the valley.

the Vale of which we call the Indus Civilization. The Archaeo*western borderlands, which were very simicontemporary*

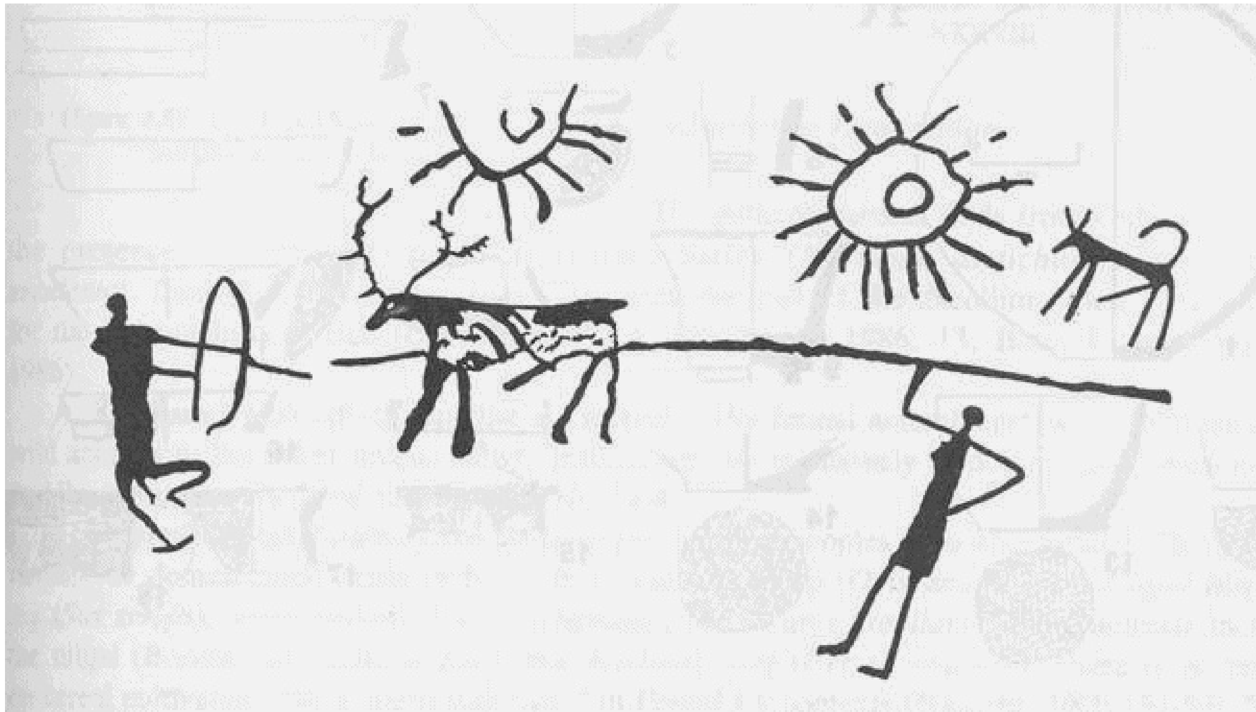
In Pakistan, we notice its influence on the Pothwar sites, such as Sarai Khola. Since there are very few, if any, sites of late Neolithic time period in northern Punjab, it is sometimes presumed that this area was populated by the people of the Northern Neolithic culture who, for lack of any architecture, left no trace of their habitation in the archaeological record.

Burzahom and Gufkral: The chronology of these two sites has been estimated by radiocarbon Borderlands! dates, and some comparative analysis. They span from 2800 to 2000 BC , thus temporally encompassing both the Early and the Mature Harappanthe semi

industry, form of
the southmost



Kot Diji pot from Burzahom Ib (contemporary Kot Diji Phase pot from Burzahom
with the Mature Harappan Civilization) IB (*after Possehl*)



Hunting scene on a stone slab at Burzahom (*after Pande***)**

type. It is rectangular, generally with two perforations along the long edge, opposite the cutting edge. These perforations were probably intended for fastening a wooden handle. In northern Asia, where these knives were widespread, they were called *ulus* and used as harvesting implements. *Ulus* have also been found at some sites in northern Pakistan, most notably Kalako-deray in Swat. Interestingly, un-peforated, square stone knives, similar to the *ulus* were found at the Mature Harappan site of Shortughai on the Amu Darya (Oxus River).

The cultural and historical affinities of these people at Burzahom are clearly North Asian as recognized by a number of scholars, including Allchin, Mughal, Fairservis, Agarwal, and Possehl. The principal parallels are the semi-subterranean dwellings,Borderlands!
mat impressed pottery, rich bone industry, form of

well into the Harappan phase. ground stone tools, and the dog burials. Some scholars have attempted to disregard the 'alien'
This culture, probably originating in north China, co-existed side by side with

elements in the Northern Neolithic cultures and
the Indus culture for a long period of time and influenced the northern areas of
have portrayed it as something home-grown. The
ancient Pakistan till it was absorbed by the urban culture of the Greater Indus
evidence, however, is too strong to deny this affinity.
Valley that was to come. There is no doubt that in doing so, the northern culture
Stages. The late Neolithic dates are from 2000 to 1500 BC, a timeline represented by Late Harappan
may well have started with the Mesolithic

or Post Harappan Stages. In the context of the over ofcultural developmentEurope and which survived in theof the Greater Indus Valley,
one may consider the Northern Neolithic as the late

fertile valleys of Kashmir and perhaps of arrival of the Neolithic culture in this part of Paki

must have left behind some desirable traits for the benefit of the ensuing urban culture, which we call the Indus Civilization. The Archaeological Survey of India has conducted majo r excavations two Northern

stan, not through economy from the rest of the Indus Valley but from
clearly inner
the expansion ofHunza, Baltistan and Ladakh. It is soagricultural Asian that one finds
outside of it. in including it as a part ofdifficulty Burzahom and Gufkral were both farming
Pakistan's archaeology except for the fact
villages. Many of their dwellings were subterranean, with hearths and a central pole supporting the roof.system of that it existed in the river
People were cultivators of barley and cared for do
mesticPakistan.animals: sheep, goats and dogs. They clearly engaged in some hunting, as revealed by The Northern Neolithic tradition is a

the faunal remains, as well as from an interesting scene engraved on a slab of stone. It shows twodefinitive manifestation of one of the hunters and their dog in an attack on a deer under a

cultural streams, which were through time double sun. One of the hunters is armed with a
directed toward Pakistan. In this context,
spear, the other with a bow and arrow. Northern the
Neolithic people had pottery: it is soft, and grey to
existence of a completely alien *after Halim)*
brown, with mat and cord impressions.
culture in the northern borderlands of
These people made a rich bone tool indus

try Pakistan and its interaction with the Induscerated points. The stone tools are mostly ground, with oval, pointed butt axes, flat ring stones of jadite and a small knife. The latter implement is quite specific in

from the contemporary cultures of the eastern 463
Neolithic sites in the Vale of Kashmir: Burzahom and Gufkral. They lie on the
By all accounts, the Northern Neolithic tradition is a
definitive manifestation of one of the culturalIndian side of Kashmir. Twenty-five settlements of this type have been reported so far. They are concentrated in the southeastern quadrant of the valley.
streams, which were through time directed toward
Pakistan. **Burzahom and Gufkral:** It differed from the prevailing cultures in
The chronology of these two sites has been estimated the western borderlands, which were very similar in
by radiocarbon dates, and some comparative analysis. They span from 2800 to

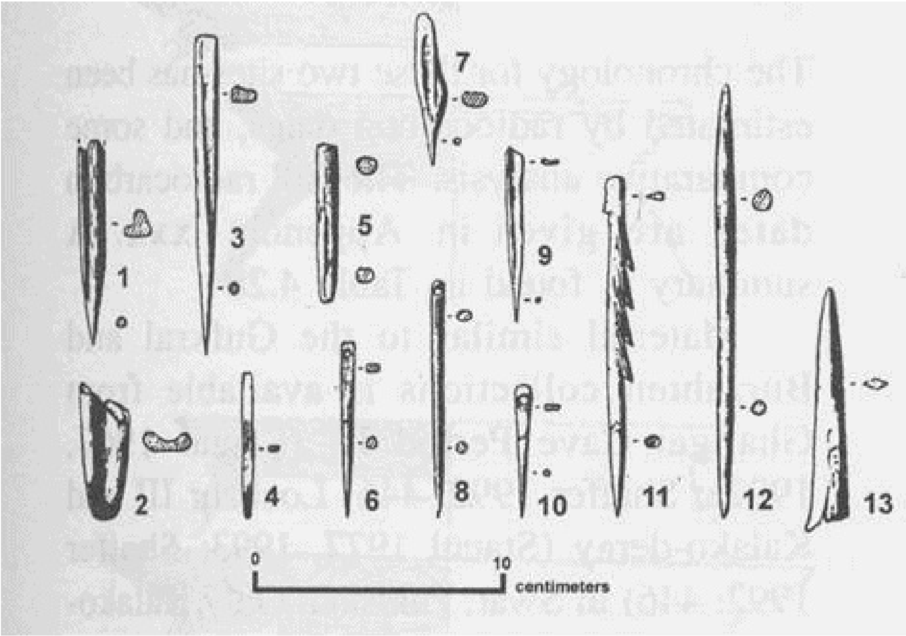
nature to those of the Indus Valley. It also differed
2000 BC , thus encompassing both the Early and the Mature Harappan Stages.
from the contemporary cultures of the eastern bor
The late Neolithic dates are from 2000 to 1500 BC, a time represented by Late derlands which mainly represented an earlier stage
Harappan or Post Harappan Stages.
of the same culture as it prevailed in the Indus Valley.Burzahom and Gufkral were both farming villages. Many of their dwellings were subterranean, with hearths and a central pole supporting the roof. People
Material similar to the Burzahom and Gufk
were cultivators of barley and cared for domestic animals: sheep, goats and dogs.
ral collections is also available from Ghaligai Cave
They clearly engaged in some hunting, as revealed by the faunal remains, as well
III, Loebanr III and Kalko-deray in Swat. Only Kalko
as from an interesting scene engraved on a slab of stone. It shows two hunters
deray seems to have sufficient material to suggest
and their dog in an attack on a deer under a double sun. One of the hunters is
that it was settled by peoples of the North, the re

maining material coming to Swat through interaction with them. The chronology suggested does not conflict with estimated dates for these two sites. Further
typological parallels appear in the Neolithic levels of Sarai Khola, near Taxila.

There is a long list of products found at Early Harappan and Mature Harappan sites on the

 plains which are likely to have come from the Northern Neolithic culture. Similarly, quite a few Indus products have been found at Borzahom. For example, two Kot Diji Phase type pots were found, one of them contained 950 beads of carnelian and agate and was decorated with the face of a water buffalo. These artifacts are undoubtedly of imported origin rather than the products of the Northern Neolithic people. The extent of the interaction of the In

armed with a spear, the other with a bow and arrow. Northern Neolithic pottery
dus people with the northern Neolithic people is not with eastern Iran across the occasional and rather
yet clear. Still, it is obvious that these peoples were isolated desert oases. These interaction sometimes is soft, and gray to brown, with mat and cord impressions.
at least among those that the Early and Mature extended as far as Cholistan in the East and the Harappan people dealt with.These people made a rich bone tool industry with points, needles, harpoons, and Zogros in the West. The similarities in painted mocerated points. The stone tools are mostly ground, with oval, pointed butt axes,
tifs on pottery constitute the archaeological evidence.



Bone artifacts of the northern Neolithic from Burzahom (*after IAR*)

Bone artifacts of the Northern Neolithic from Burzahom

been found at some sites in northern Pakistan, THE EASTERN BORDERLANDS in Swat. In the above we reviewed the prehistoric square developments in the borderlands to the West and stone knives, similar to the *ulus* were found the Northwest of Pakistan and examined how the at the Mature Harappan site of Shortughai Indus man interacted with the inhabitants of these regions. We noticed a very intimate, sustained, and on the Amu Darya (Oxus River).

flat ring stones of jadite and aWhen we face to the East and enter the small knife.

The

present day India, however, we find the situation

latter

completely different. Here we see the Indus man implement is quite specific in largely isolated from the peoples to his East. There type. It is rectangular, generallyis no robust interaction zone, there is no commonality of culture, there is no mutual effort for the devel

with two perforations along the

opment of agriculture and village farming communi

long edge, opposite the cutting ties, there is no participation of the peoples across edge. These perforations were the border in the evolution of an incipient urbanization, and there seems to be no visible migration of

probably intended for fastening
men and beasts across each other's cultural zones.
a wooden handle. In northern All in all, there are no comparable developments Asia, where these knives werethat can be viewed as a common heritage of the
widespread, they were called two peoples and there is little visible diffusion of
ulus
culture and technology across the borders. and used as harvestingThis situation is not a chance happening, it implements. *Ulus* have alsorests on the geography of the region. Such an es

trangement between the inhabitants of the two geographic regioons lasted almost up to the medieval times, barring a few centuries of contact during the

most
notably
Kalako-deray

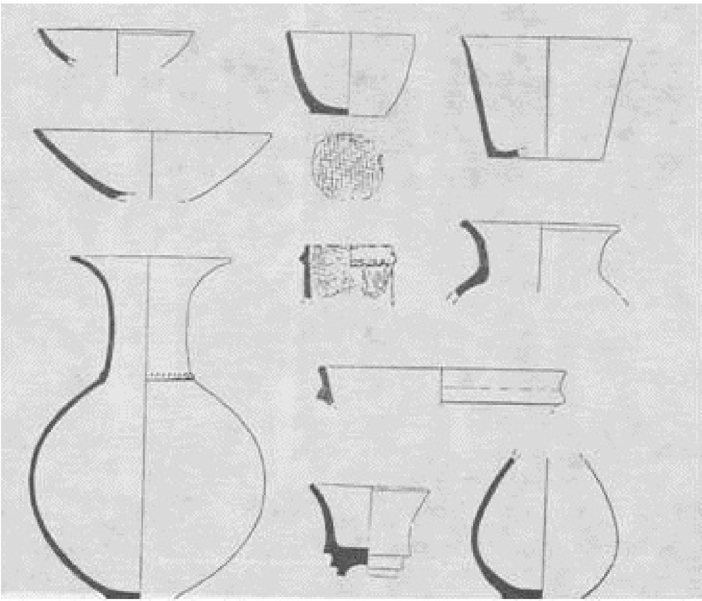
eastward expansion of the 'Aryanized' Indus people into the Ganges plains in the wake of the Iron Age. Interestingly, unpeforated, During this time, the northeastern and southeastern corners of the Pakistan-India borders served as two narrow corridors of contact, one along the foothills of the Siwaliks and the other along the coastline.

enduring relationship between the Greater Indus
Material similar toValley and Central Asia right from the Paleolithic Burzahom and
Gufkraltimes. We also observed the active participation ofavailable from
Central Asia with Baluchistan in domestication of
Ghaligai Cave III, Loebanr III and Kalko
animals and plants, the development of agriculture
based economy, and establishment of settled vil
deray in Swat. Only Kalako-deray seems to
lages. The rise of arts and crafts, and the evolution
have sufficient material to suggest that it

This time period is, however, outside the scope of this volume and for the purpose of the present disthe cussion we shall be content in assuming a very limcollections is ited contact between the people of Pakistan with those inhabiting to their east.

The presence of the Thar Desert between Pakistan and the present-day India, the brush jungle and marshland to the north of the Thar and the

of incipient urban life in Central Asia went hand in
was settled by peoples of the North, the



Burzahom I and II : Burnished grey-black pottery (*after Allchins*)

perennial marshes and desolate salt plains on its hand with that in Pakistan. These cultural, technosouthern extremity effectively restricted the moveremaining material coming tological, and trade relationships between Pakistan
Swat through interaction with them. Thement of people and beast from one region to the and the western borderlands began millennia ago other and severely diminished the chance of mutuand endured up to very recent times.chronology suggested does not conflict with estimated dates for these two sites.

Further typological parallels appear in the Neolithic levels of Sarai Khola, near ally affecting each other's cultures. The result was cultural relationship with southern Afghanistan,Taxila.
which, in turn, intimately interacted with the Quetta
that, for instance, while the peoples of the Indus Valley were enjoying the fruits of urbanization, the

peoples on the other side of this barrier were still
Valley throughout its prehistoric time. Additionally,The cultural and historical affinities of these people at Burzahom are clearly living a life of hunter-gatherers or at best that of thewe have highlighted the relationship of settlements
North Asian as recognized by a number of scholars, including Allchin, Mughal,nomadic pastoralists.
A lot has been written on the in the south of Afghanistan with those of Central
Asia. The cultural relationship of Altyne Depe in
Turkemania with Mundigak in Afghanistan, which

'Neolithic India' but little is known about the foraging groups that populated this region of South Asia. One thing is, however, clear: the peoples of the Inwas in turn intimately related to the Quetta Valley and by extension with Mehrgarh is one of the various manifestations of this extensive cultural exchange. Thus, a picture of prehistoric Central Asia emerges that displays a series of more or less common cultures throughout the region over a long period of pre-historic time. This prehistoric picture also reveals a series of intimate, although somewhat sporadic relationships of southern Baluchistan dus Valley had very little contact with the peoples who lived across the Great Desert. There was practically no basis of any cultural interaction, one was a society of settled agriculture, the other was that of the foraging nomads.

Limited the possibilities of mutual contacts as they were, peoples of neolithic Pakistan were, however, not absolutely isolated from the inhabitants of the East. In the late Neolithic times or somewhat later in the Early Harappan time frame, we see the migration of the Indus pastoralists along the coastal region to the east and this resulted in the colonization of the south-western parts of Gujarat by the people of Sindh. It was, however, during the third millennium BC that the argo-pastoralists of the Indus Valley started to establish permanent settlements in this region on any substantial scale. This movement gathered full steam during the second millennium BC when the so-called “urban Harappans” started to migrate eastward and establish several Late Harappan or Post-Harappan settlements in Kutch and southern Gujarat. Again, it was not an intimate relationship between the two regions on the scale that we observed in the case of the Indus people engaging those of the West. Obviously, these relationships were also not as deep rooted as they were in the West. Furthermore, the whole movement seems to be from the West to the east and rather localized.

We observe the same situation in the northeastern node: the Indus man penetrating into Indian Punjab, Haryana, Rajasthan, and the region that lies along the riverbed of the now dried up GagharHakra river braids. All these areas lie just across the present-day Indo-Pakistan borders and are geographically a part of the Greater Indus Valley. There might have been some marginal contacts between the inhabitants of the arid zone of Cholistan with those who lived in the foothills of the Aravalli, across the Thar Desert but the archaeological evidence is scanty, if at all.

Contrary to the situation in the Southeast, where the Indus people were penetrating a culturally ‘virgin’ land, the area of penetration in the Northeast had an indigenous culture, based on pastoral communities and occasional permanent settlements. This culture has been named Sothi-Siswal Culture on the basis of the two type sites where it was discovered. Mughal does not agree with this appellation; he thinks that all the artifacts, mainly pottery, are nothing but a poor reflection of the Kot Diji material culture. In his opinion, the Sothi-Sisal pottery, instead of being a product of a distinct, indigenous culture, is a regional rendering of the pottery tradition of Kot Diji Phase.

No dates are available for the beginning of this interaction between the Greater Indus Valley and the Indo-Gangetic Divide. On the basis of the evidence from Kalibangan, one can estimate it to be around 2500 BC at the earliest. The Harappan Phase at Kalibangan is somewhat later, almost to the end of the Harappan Civilization, ca. 2000 BC. Like the southern node, the full impact of the Indus influence in this region is felt during the Late Harappan, or still better during the post-Harappan period in the second millennium BC. Again, like the situation in the South, it was largely a one-way street.

All these contacts, as limited and as hesitant as they were, were significant enough as to affect the spread of domestication of goat, sheep, and cattle from the Indus valley to the neighboring regions of India, especially through Gujarat in the South and the Divide in the north. A little later, the cultivation of barley, wheat, and legume was also affected through the same process. At the same time, the people of the Indus Valley may have acquired some new food crops from the East, such as millets from Gujarat..

The description of the Neolithic developments in India as a whole is truly confusing and their chronology is full of controversies. This topic has already been adequately thrashed out earlier and need not be repeated here. If we equate the Neolithic with the development of agriculture and sedentary living, then the bulk of the present-day India entered the Neolithic period quite late, around 1500-2000 BC and in some regions even later. In this respect, India, excluding the two nodes of

contacts referred to above, lagged behind Baluchistan more than 4000 years and Sindh and Punjab almost 3000 years. If, however, we consider the Neolithic on the basis of stone tools alone, then India does have a Neolithic period going back to 3000 BC in some regions. All in all, archaeology does not provide us with the pervasiveness of the Neolithic way of living in any part of India during the time span covered in this volume except the two regions that formed the interaction node mentioned above and this too after 3000 BC.

For the sake of this discussion, we are not concerned with India as a whole: it is too large an area to survey and the archaeological evidence is too confusing and contradicting to draw any sound conclusions. We are better off to concentrate on the immediate borderlands only, that is, the NorthEastern Borderlands, South-Eastern Borderlands, and Mesolithic sites in neighboring Rajasthan.

As we discuss these areas of limited extant, we must keep in mind that even here we do not know much about the life style which was prevalent for almost all of the temporal horizon with which this volume is concerned with. This leaves us with only a brief period of time to discuss, namely the time period that is approximately contemporary with the later part of the Early Harappan Stage, more particularly with the Late Kot Diji Phase of Sindh and Punjab.

Pastoral People without Agriculture: It is apparent that pastoralism emerged as an adaptation at the very beginning of the food production within in Pakistan and the surrounding regions. Direct evidence for such camps in Baluchistan exists at Anjira around 5000 BC and a small unexcavated site known as Lal Ghundai. An example of a lowland site where pastoral nomads may have camped during the winter is Gumla I, an aceramic level of the site. Microlithic as well as ground tools were used. Hearths or ‘community ovens’ were also found, but there is no architecture and there is no seed agriculture.

Similar pastoral camps have been located on the eastern borders with India also; Bagor in Rajasthan is one of them. This is an important archaeological site, located on a sand dune on the eastern side of the Aravalli Range. The dune is adjacent to the Kotharu river, a tributary of the Banas, the major river of the region. It was excavated by V.N.Misra of Deccan College (46). The significance of Bagor stems from its microlithic tool industry associated with pottery, metal artifacts and the remains of domesticated animals. Bagor is the largest mesolithic habitation discovered in India. It is the only one to have been horizontally excavated so as to expose extensive living floors. The variety and quantity of cultural materials recovered from the site are rich and varied compared with most mesolithic sites so far known both in India and Pakiostan, and it has given us an insight into the process of occultation in a stone age community arising from contacts with full-fledged farming cultures. Bagor also possesses the largest number of radiocarbon dates for any site of this nature and is thus the most securely dated of all mesolithic sites in the Indian subcontinent.

Most of the radiocarbon dates fall between 5000 and 3000 BC for Period I; 2800 and 600 BC for Period II; and 600 BC to 200 AD for Period III. Bagor seems to be outside the cultural traditions that gave rise to the settlements in Baluchistan and Kachi plain. It is, however, contemporary with some of the sites in Sindh and Punjab and presents some interesting challenges to interpretation. It is taken here as an example of the manner in which hunting and gathering people can easily find use for domesticated animals and can quite easily integrate them into their livelihoods. The source for the domesticated animals was probably stray and stolen stock from the people who interacted with the people of the Indus across the Thar Desert. Bagor may also provide a life style which was rather

common in the borderline areas, interacting somewhat with the farmers, adopting their ways some, but basically still living a life of the Epipaliolithic.

The common element running through the Bagor sequence is the industry of several hundred thousand microlithic tools. The industry was based on the mass production of microblades from polyhedral cores of quartz and chert, not locally available. Misra speculates that this industry was well suited to hunting, which seems reasonable. Large floors made of schist slabs quarried from across the Kothari river, combined with pebbles, were found in Period I and II. One burial was found in Phase I contexts. It was extended and supine. No grave goods were found. There was no pottery in Period I but it was in Period II. The domesticated animals of Period I include zebu, sheep, goat and pig. The inhabitants of Bagor were also hunters and the remains of various animals were found there. The mix of domesticated and wild animals associated with the camp of a people with a microlithic tool industry is indicative of the range of adaptations of people in protohistoric times in the subcontinent.

CONCLUSION

The cultural developments in the northwestern borderlands, especially in southern Afghanistan, northeastern Iran, and the large area of Turkmenistan, are very important in context with the cultural, economical, and technological developments in ancient Pakistan. Pakistan, especially Baluchistan and the Kachi plains west of the Indus, has been in close and enduring contacts with these regions since the dawn of the Holocene. Three things stands out: first, these relationships were intimate, second, they were sustained over a very long period of prehistoric as well as historic times, and third, the developments in all of these regions were on similar lines and more or less contemporary.

There is strong indications of northwestern influence on the stone tool traditions of the Middle Paleolithic Pakistan, *ca.* 40,000 years BC. Genetic evidence indicates that probably an actual migration of Central Asian peoples to the Indus Valley took place under the duress of extremely cold climate of the Hindu Kush in the late Pleistocene period. A string of early farming village sites has been traced from the Zagros in western Iran to the Vale of Farghana in Turkestan. While the interconnections between such sites are not altogether clear in every case, sufficient evidence has been gathered to show that village life based on a closely comparable technology existed there before 5000 BC. There is also a strong archaeological evidence that a close link existed between these sites in Turkmenia and southern Afghanistan, as represented by the site of Mundigak. Mundigak, in turn, is so close to the Quetta Valley culture that the artifacts found in both places are almost indistinguishable. The QuettaPishin Valley, as we know, is geographically connected with Kachi area at the edge of the Indus Plains through the Bolan Pass. Thus, ancient Pakistan was intimately connected, not only by geography but also by culture, with the Kandhar area and then to Central Asia. This region of common culture also included northern Iran of which Shahr-e-Sokhta is an important prehistoric site.

A similar situation did not exist between eastern Iran and southwestern Baluchistan for geographical reasons, but we still find some clear interaction between these two regions. There is a series of deserts between southwestern Baluchistan and Iran. These interactions were, therefore, limited. The principal means of interaction were most likely the pastoral nomads rather than trade. Since the movement of nomad depends on the availability of water along the migratory paths, it must have heavily depended on climatic conditions, of which rain must have been a crucial element. This explains the sporadic nature of these contacts and the resulting isolation of Baluchistan from Iran for

long periods of time.

To the north, there was an alien culture of the Northern Neolithic in the Vale of Kashmir. These people had some interaction with the people of the Indus valley and a small interaction zone did develop in the north of Punjab. Some of the Northern Neolithic settlements extended into Swat and northern plains of the Greater Indus Valley, at places like Sarai Khola and possibly Outlay in Pothwar. They represent a cultural tradition whose origin is outside of Pakistan as well as outside its eastern and western borderlands. Judged from their tradition of habitation (the so-called pit dwellings), burial practices (co-burial of dog), and the typology of stone tools (*ulus* knife of Chinese Turkestan), this culture seems to have its origins in the northwest of China. The interaction of the Indus man with the peoples of the Northern Neolithic in Kashmir has not been as profound as that with its northwesterly neighbors in Central Asia. Nevertheless, it is a definitive manifestation of one of the cultural streams, which were through time directed toward Pakistan.

The cultural and technological developments in India and its interaction with Pakistan is virtually a study in contrast. Contrary to the interaction of the Indus man with his westerly neighbors, with whom he had long standing, intimate, sustained, and enduring relationship, his interaction with the inhabitants of the easterly borderlands was limited and quite hesitant. This has been largely because of the geographical constrains although cultural differences, created though the millennia, may have also played a role.

A large desert, the Thar, intervenes between Pakistan and the present-day India, leaving a small strip of land in the Northeast and a similarly narrow corridor in the Southeast, through which Pakistan could communicate with India. However, the northern strip of land was heavily forested which, until the dawn of the Iron Age, prevented the two peoples meet. Similarly, the southern node was rife with expansive salt deserts and marshes of the Indus delta and these proved to be significant impediments to any meaningful contact between the two adjoining regions. Nevertheless, some marginal contacts were possible.

The line of demarcation between Pakistan and India that ran through the Northeast-Soutwest through the Thar desert, are more or less the current political borders between Pakistan and India. This geographical impediment was most likely created during the dry spell in the Pleistocene era. Since then, the developments in Pakistan have been independent of India and vise versa. This fact created a disparity between the two as early as the Upper Paleolithic period, some 40,000 years ago. The cultural and technological differentiation intensified with time till the onset of the Holocene. India as a whole did not take part in the ensuing agricultural revolution. Thus, while Pakistan's people as a whole became the dwellers of agricultural villages and small towns, those of India continued existing in a state of nomadic existence steeped in pastoral economics for a long time.

In spite of these geographical impediments and despite the glaring disparity in subsistence regime, some limited contacts did materialize between the two regions. The nature of these interactions were, however, quite different from those to the west. While the Indus man interacted with the people of the western borderlands on the basis of mutual give-and-take, his relationship with the easterly neighbors, as limited as it was, was mostly one sided. With the southeast, he interacted through expansion into Gujarat, and with the northeast through a process of cultural diffusion.

It is interesting to note that before the Early Harappan period the Indus man did not venture eastward beyond the Indus system. Both the SutlejBias and the Gaghar-Hakra rivers, around which the Indus

people spread their influence in the Northeast, were the tributaries of the Indus. Similarly, the area of the colonized Gujarat lied mostly around the delta of the Indus. Thus, all in all, it looks as though the Indus man remained within his natural boundaries which he had already established during the Paleolithic times, some 40,000 years ago.

VI.8. References

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VII.2. Glossary

Absolute dating is the process of determining a specific date for an archaeological or palaeonto logical site or artifact in calendar years.

Acculturation is the process by which a culture is transformed due to the massive adoption of cultural traits from another society--it is what happens to a culture when alien traits diffuse in on a large scale and substantially replace traditional cultural patterns. This term is used to describe both the process of contacts between different cultures and also the customs of such contacts. As the process of contact between cultures, acculturation may involve either direct social interaction or exposure to other cultures by means of the mass media of communication. As the outcome of such contact, acculturation refers to the assimilation by one group of the culture of another which modifies the existing culture and so changes group identity. There may be a tension between old and new cultures which leads to the adapting of the new as well as the old.

Adaptation: The process of change to better conform with environmental conditions or other external stimuli.

Adaptive mechanism: a behavior, strategy, or technique for obtaining food and surviving in a particular environment. Successful adaptive mechanisms provide a selective advantage in the competition for survival with other life forms. For humans, the most important adaptive mechanism is culture.

Agriculture: The term is used here to refer to the adoption of deliberate cultivation and animal herding/tending leading to the biologically identifiable species. domestication of plant and animal

The adoption of an agricultural way of life is therefore seen as a precondition of domestication.

Analysis: the process of studying and classifying artifacts, usually conducted in a laboratory after excavation has been completed.

Archaeology: cultures by (sites and artifacts) that people left behind.

Archaeological site: a place where human activity occurred and material remains were deposited.
Artifact: any object made, modified, or used by people.Common examples include tools, utensils, art, food remains, and other products of human activity
the scientific study of past human analyzing the material remains
Assemblage: artifacts that are found together and that presumably were used at the same time or for similar or related tasks.
Attribute: a characteristic or property of an object, such as weight, size, or color.
Band: the level of political integration in which a society consists only of an association of families living together. Bands are loosely allied by marriage, descent, friendship, and common interest. The primary integrating mechanism is kinship ties. There is no economic class differentiation. All adults of the same gender are more or less equal as far as community decision making is concerned. However, some individuals in a band may stand out for their skills and knowledge. These often are the people who have the best memories, are the best hunters, most successful curers, most gifted speakers, etc. Such people become informal leaders. Most often they are given authority by community consensus arrived at through casual discussion without the need for a formal vote. Leaders generally have temporary political power at best, and they do not have any significant authority relative to other adults within their band. Subsequently, bands are essentially acephalous

societies. The total number of people within these societies rarely exceeds a few dozen. Bands are found among foraging societies

B.P: years before present; as a convention, 1950 is the year from which B.P. dates are calculated.

Carrying Capacity: Carrying capacity is the theoretical equilibrium population size at which a particular population in a particular environment will stabilize when its supply of resources remains constant. It can also be considered to be the maximum sustainable population size; the maximum size that can be supported indefinitely into the future without degrading the environment for future generations.

Ceramic: pottery, fired clay.

Cereals: the edible seeds of grasses. The economically most important cereals include wheat, rice, and corn (maize), oats, rye, millet, and sorghum. These grains provide the bulk of the calories consumed by people in the world today

Chert: A very fine grained rock formed in ancient ocean sediments. It often has a semi-glassy finish and is usually white, pinkish, brown, gray, or blue-gray in color. It can be shaped into arrowheads by chipping. It has often been called flint, but true flint is found in chalk deposits and is a distinctive blackish color.

Chronology: an arrangement of events in the order in which they occurred.

Chronometry: The art of measuring time accurately

Cists: Boxed burials (eg: some of the Neolithic graves at El Garcel, Almeria, Spain) are refered to as Cists burials. The term simply comes from the german word 'Kiste' meaning a box or crate

Classification: a systematic arrangement in groups or categories according to criteria

Context: In excavation, the context is the layer of material and other finds which were deposited at the same time. When digging, we find areas of the same soil structure uniterupted by other soils. Each is refered to as a context. Each context is given a reference number and we record what was in each context. It is usually only later when we are looking at all the contexts and their relationships to each other that we get a good understanding of what exactly was going on.

Culture: a set of learned beliefs, values and behaviors--the way of life--shared by the members of a society **Debitage** The by-products or waste materials left over from the manufacture of stone tools.

Cultivation: The term cultivation refers to deliberate planting or sowing, harvesting, processing, storing and replanting of specific types of plant. It involves the deliberate management of plant growth in specific dedicated areas on a cyclical basis. Unlike domestication, it is a cultural process which involves regular and necessary activities, including the preparation of land, sowing of seeds, harvesting of grain and its storage. Changes in technology, subsistence strategy and social relationships would have been necessary in order to achieve a lifestyle based on cultivation.

Demography: The study of the distribution, density, and vital statistics of populations

Diffusion: the movement of cultural traits and ideas from one society or ethnic group to another. While the form of a trait may be transmitted to another society, the original meaning may not. For instance, *McDonald's* hamburgers are thought of as a cheap, quick meal in North America, but they are generally considered to be a special occasion food in China.

Domestication: The term domestication refers to the way in which animals and plants change due to human intervention, becoming biologically distinct from wild forms, and often dependent as a result of these changes on human maintenance and management. It is a biological, not a cultural process, although it may be the result of human selection. Ingold describes it as the isolation of “a breeding population within which individuals are selected for reproduction according to the degree to which they conform to an ideal type”. Clutton-Brock also provides a useful and broader definition: “a domesticated animal is one that has been bred in captivity, for purposes of subsistence or profit, in a human community that controls its breeding, its organization of territory and its food supply. . . . The

end product of domestication is the breed: a group of animals bred by humans to possess a uniform appearance that is inherited and which distinguishes it from other animals of the same species". The process of domestication will be discussed later.
Epi-Paleolithic: The term Epipalaeolithic refers to the final Palaeolithic stage and is sometimes also referred to as the Terminal Palaeolithic. It is characterized by use of a specific stone tool kit, which included smaller more specialized tools, and is often associated with a move to more organized and intensive plant exploitation, with stone pestles and mortars for processing wild cereals.
Excavation: the systematic digging and recording of an archaeological site
Food resource management (FRM): The term refers both to hunter gatherer and agricultural communities and is simply used to express the idea that human populations with successful subsistence strategies have the capability to, and often employ, methods of determining outcomes by treating environments, plants and animals in specific ways which are designed to improve and maximize food resources.
Foraging: Foraging for wild plants and hunting wild animals is the most ancient of human subsistence patterns. Prior to 10,000 years ago, all people lived in this way.
Flotation: A method of obtaining seeds and other organic materials from soil by using liquids.
Herding: The term herding refers to the management of groups of animals – either in a settled or mobile context, usually in a secondary role to plant cultivation, where plant cultivation occurs. It represents an intentional relationship established by humans over animals which were suitable for domestication.
Interaction Sphere: This term refers to prehistoric groups who shared social interaction and exchanged material goods, through a network made up of long distance trade contacts
Jomon People: Named after a site in Japan (dated around 13000-2500 Before Present), the Jomon culture is currently credited with the invention of pottery, some 12,000 years ago. When Japanese archaeologists tell british archaeologists about the Jomon, the brits get very upset. While the Jomon were building houses and making pots, the mesolithic brits were eating mud and picking their noses
Level: an excavation layer, which may correspond to natural strata. Levels are numbered from the top to bottom of the excavation unit, with the uppermost level being Level 1 Lithic stone, or made of stone Material remains artifacts, features and other items such as plant and animal remains that indicate human activity.
Midden: The layer of soil which contains the byproducts of human activity as the result of the accumulation of these materials on their living surface. For prehistoric sites, a layer of soil that was stained to a dark color by the decomposition of organic refuse which also contained food bones, fragments of stone tools, charcoal, pieces of pottery, or other discarded materials. For historic sites, a similar layer of soil but with appropriate historic material remains often in a much thinner deposit
Old World: The Old World is Europe, Asia, and Africa. The Americas are conventionally referred to as the New World. This distinction is largely an ethnocentric reflection of the European origin of our modern sciences and geography.
Microlith: A very small flake of stone (often flint) which was deliberately removed from a 'core' and then used as a tool. Since microliths are often just a centimeter or two long, they were probably hafted onto a wooden handle. The mesolithic period in Britain (12,000 to 4,000 years ago) is particularly associated with microliths.
Paleolithic: The term Paleolithic means "Old Stone" and spans several million years of human tool usage, and several different types of human of the genus Homo, of which we are simply the most recent. The Paleolithic is characterized by groups of individuals who made and used tools of stone, bone, ivory, antler and wood, and hunted animals, gathered plant foods and fished. They are usually referred to simply as Hunter-Gatherers. They lived in caves, rock shelters and in man-made

settlements in open locations, usually near a water source. This is the time period from about three and a half million years ago until the end of the last ice-age (approximately 12,000 years ago).
Pastoralism: The term pastoralism refers to the human practice of raising and tending animals as a primary component of the economy. Pastoralism may occur with cultivation, but only where animal maintenance is the main activity, and it may equally take place on its own. Some exclusively pastoral groups are nomadic, meaning that they are mobile, shifting from settlement to settlement in order to find food and water for livestock. Pastoral nomads quite often occupy desert and marginal environments and only attempt to manage a small range of domestic animals. They are characterized by low population numbers, portable items, and extensive trade with cultivators.
Pastoralists: people who make their living by tending herds of large animals. The species of animals vary with the region of the world, but they are all domesticated herbivores that normally live in herds and eat grasses or other abundant plant foods (e.g., cattle, horses, sheep, reindeer). Traditional pastoralists are essentially subsistence herders who form small-scale societies. There are essentially two forms of pastoralism--nomadism and transhumance. pastoral nomadism traditional pastoralists who follow a seasonal migratory pattern that can vary from year to year. The timing and destinations of migrations are determined primarily by the needs of the herd animals for water and fodder. These nomadic societies do not create permanent settlements, but rather they live in tents or other relatively easily constructed dwellings the year round. Pastoralist nomads are usually self-sufficient in terms of food and most other necessities.
Pleistocene: A geologic period, usually thought of as the Ice Age, which began about 1.6 million years ago and ended with the melting of the large continental glaciers creating the modern climatic pattern about 11,500 years ago. Prehistoric the period of time before written records; the absolute date for the prehistoric period varies from place to place
Quern: A shaped stone used for grinding grain
Radiocarbon Datging: A process that provides absolute dates by counting the radioactive decay of carbon in the remains of once living plants and animals (i.e., charcoal, wood, bone, shell).
Rock art: a general term for pecked, incised, or painted figures on rock.
Rock Shelter: A small cave or overhang of rock which afforded some degree of protection from the elements either as a permanent camp or temporary location of activity.
Relative Dating: Dating an artifact, site or layer as older or younger than something else, rather than absolute dating (eg "this pot was made in 4004BCE")
Sedentary: A term applied to human groups leading a settled, non-migratory lifestyle.
Sherds: The individual pieces: the method used by horticulturalists to clear fields of heavy vegetation in preparation for planting new crops. Brush and small trees are cut down and allowed to dry out in place. They are then burned. This simultaneously clears the field of all but large trees and adds ash to the soil surface. The ash acts as a fertilizer. No other fertilizer is applied to the field. As a result, soil productivity lasts only for a few years.
Shifting agriculture the horticultural practice of shifting from one field to another when crop production drops due to the inevitable depletion of soil nutrients. Shifting agriculture is also referred to as "swidden cultivation"
Slip: Liquid clay which is painted onto pottery before it is fired to add decoration and to make pourous pottery more water resistant.
Strata: many layers of earth or levels in an archaeological site (singular stratum) Cultural remains and natural sediments become buried over time, forming strata
Stratigraphy: the layering of deposits in archaeological sites.
Subsistence Economy: The means by which a group obtains the food and shelter necessary to support lifeSubsistence agriculture is selfsufficiency farming in which farmers grow only enough

food to feed their families. The typical subsistence farm has a range of crops and animals needed by the family to eat during the year. Planting decisions are made with an eye toward what the family will need during the coming year, rather than market prices. Tony Waters[1] writes: "Subsistence peasants are people who grow what they eat, build their own houses, and live without regularly making purchases in the marketplace." Subsistence graingrowing agriculture (predominantly wheat and barley) first emerged during the Neolithic Revolution when humans began to settle in the Nile, Euphrates, and Indus River Valleys. It was the dominant mode of production in the world until recently, when market-based capitalism became widespread. Subsistence horticulture may have developed earlier in South East Asia and Papua New Guinea. Subsistence farming continues today in large parts of up-country Africa, and other countries of Asia and Latin America. Subsistence agriculture had by and large disappeared in Europe by the beginning of World War I, and in North America with the movement of sharecroppers and tenant farmers out of the American South and Midwest during the 1930s and 1940s. In Central and Eastern Europe subsistence and semi-subsistence agriculture reappeared within the transition economy since about 1990

Survey: the systematic examination of the ground surface in search of archaeological sites

Typology: A way of organizing artifacts based on the shared characteristics like shape size and material

Outcrops: A term designating the surface exposure of rock layers, which have not been decomposed into soil.

Wattle and Daub: Walls built by building a framework of interlaced twigs or thin split branches (the wattle) which was then daubed with clay or excrement and horsehair to form a surprisingly effective wall. The wattle rarely survives in the ground but the imprint of the latticework of sticks can be seen in the clay daub